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THE NEWER PUBLIC HEALTH*

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The Health Officer of the District of Columbia

The World War and the subsequent world-wide economic collapse, from which we are only now emerging, has been the cause for much speculation and thought concerning the soundness of our philosophy of life in general, and the adequacy of the factors that are determining present-day civilization in particular. Is the materialistic civilization of the Occident a failure?, Is the spiritual philosophy of the Orient superior?, are questions that are again brought to the fore.

Those who wish to gain a broader aspect of the various factors that are commonly recognized as determining our present-day civilization will find interesting and altogether reassuring reading in that collection of essays edited and brought out by Professor Charles A. Beard under the title "Whither Mankind?".

Obviously, it is not the purpose here to enter upon a detailed discussion of what civilization is or why it has failed us. Reference to the undoubted greatly stimulated world-wide interest in a reëxamination of the tenets and practices of what we are pleased to call civilization is made solely for the purpose of subscribing to the soundness of the practice of periodic stock-taking.

Life being dynamic, and never static, cannot be conceived under never changing, fixed conditions. There must be constant adaptation to constantly varying conditions. Civilization as a mode of living may, therefore, very properly be defined in the terms of Hu Shih, Chinese savant and one of the contributors to the collection of essays in Professor Beard's "Whither Mankind?" as the "sum total of the achievements of a race in adjusting itself to its environment."

Accepting, therefore, the principle of a need for constant adaptation or adjustment to a changing environment and applying it to our subject, it appears both proper and, in fact, necessary that we reëxamine the teachings and practices of public health. What are the basic reasons for public health? What, and why the present practices? What its likely future?

It will be helpful to a better understanding of our thesis if we begin by defining our terms specifically, clarifying what we mean by public health. Professor C.-E. A. Winslow defines public health as "the art and science of preventing disease, prolonging life and preserving mental and physical efficiency through organized community effort."

Quite obviously this is a definition designed to describe the purposes and practices of public health in the light of the present day. Due consideration is given to science in the prevention of disease and the preservation of health. However, the enlistment of science in the interest of public health is distinctly modern. But public health is not all modern. In fact, its major part, and so far as motivation is concerned, its more significant part, lies essentially in the past.

In order that we may better evaluate the position and importance of public health as an expression of civilization we must realize that the roots of public health strike down deep into the very beginnings of mankind. After all, public health, or what is the same, the definitely directed effort to protect the life and health of the group, finds its origin in the instinctive urge for self-preservation common to all living things. The theory (convergence) advanced by Adolph Bastian, in 1881, on this point is deeply significant and apparently wholly in support of this assumption. Pointing to the appearance of identical ethnic phenomena in different relationships of space and time, Bastian asserts that, "Left to itself in a favorable environment any savage tribe will inevitably evolve a culture all its own for the regulation of food supply, sexual and social relations, adjustment to the unknown, manifesting itself as political economy, ethics, law, medicine, religion, and so on."

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* The third Davidson Lecture, read before the Society, November 13, 1935.

We must understand then, that public health, or the conservation of the health of the group, is no modern invention, but is bound up in the very development of the race and will remain an instinctively ingrained part of the thinking and behavior of the people.

It would be most interesting, if time permitted, to trace the gradual evolution of public health through the ages and among different races. A few references to indicate the general trend and to give background as well as contrast to what we shall presently discuss as the new public health must, however, suffice.

According to Sudhoff ancient Greece specialized in the field of personal hygiene—"physical invigoration by daily, systematic exercise, care of the skin by washing and bathing, by swimming and massage; physical cleanliness, including care of the hair and clothing as well as regulation of diet, rest, sleep, elimination, and of the sexual life." These were the means by which the Hellenic people sought and achieved physical fitness.

Theodore Mommsen's "History of Rome" furnishes us with a description of the rather remarkable development of public sanitation in ancient Rome at about 494 B.C. "The city was divided into four districts, each under a special police officer whose duty included the paving and cleaning of streets, the regulation of traffic, the prevention of nuisances, the control of markets, of weights, of measures, of public baths, of taverns, of houses of bad fame." The elaborate system of sewage disposal still visible in the cloaca maxima and the equally elaborate system of aqueducts that furnished the imperial city on the seven hills with an abundant water supply, all testify to a high degree of understanding of, as well as provision for, the public health needs of that time.

As of particular interest and importance in the evolution of the public health movement must be mentioned the most excellent rules laid down in the thirteenth, and subsequent, chapter of Leviticus for the control of communicable disease by isolation and quarantine. It is this light, borrowed by the Christian church from the Old Testament that alone illumines the otherwise dark years in sanitation through the Middle Ages.

We must now turn our attention to the newer public health and sift and identify the elements on which it is based. The beginnings of the movement for the new public health are found in England and go back to the latter half of the eighteenth century. In 1773, John Howard began his prison reform, convinced that filth and disease stood in causal relationship. In 1842, Edwin Chadwick stressed the connection between poverty and disease. Both these movements, while primarily dealing with social problems, nevertheless presented powerful stimuli as well in bringing about improvement in environmental sanitation, notably through the removal of filth and the protection of water supplies—practices that had a noticeable effect on the lessening of infections transmitted through infestation and of the water-borne diseases.

Then follow in the '70's of the last century the epoch-making discoveries by Pasteur, Koch, and others, revealing at last the specific cause of the infectious diseases and opening new and scientific ways for their control. Rapidly there comes now a definite change in our practice in dealing with communicable diseases. Isolation and quarantine as control measures for epidemics are applied with due consideration for the nature of the infections and the manner of their spread. In dealing with the infectious diseases in the individual, as well as in the mass, we must note the change from the purely defensive action of isolation, as prescribed in the Mosaic code, to treatment, and now prevention.

Nor does the trend in the practice of medicine towards prevention in dealing with sickness confine itself solely to the problem of the communicable diseases. With the advancement of science, notably in the realm of physics and chemistry as exemplified in the X-ray and physiological chemistry, respectively, the possibilities for early diagnosis, for early treatment, for correction and complete cure while yet damage is minor, and for prevention are enormously enlarged. Furthermore, even before bacteriology, X-ray and physiological chemistry made possible the preventive practice of today, definite activity directed toward early detection of illness, or of physical handicaps, respectively, and the correction of these, are found expressing themselves in the routine examination of children in the schools of Dresden, Germany, as early as 1867.

The further developments, notably in the realm of child hygiene, are practically contemporary history and disclose a rather complete program in preventive medicine, including in its activities prenatal care, infant welfare, care of pre-school children, and, of course, school medical supervision. It was inevitable that the sickness prevention practices launched and promoted primarily by private agencies for the good of the economically disadvantaged should presently be handed over to public and official bodies.

Among other factors that hastened the development of public health service in its present form should be mentioned the trend for the conservation of natural resources in this country and elsewhere. Quite naturally the conclusion was arrived at that the resources of the country after all were for the benefit of man and that man himself, therefore, properly should be given consideration in the conservation program (Fisher).

To the humanitarian viewpoint that came into practice toward the latter part of the eighteenth century was added now an economic consideration. Human life, as having a dollar and cents value, was deserving of governmental protection. It was also realized that sickness in the individual, after all, did not remain an individual matter. Sooner or later the disadvantage of such sickness and the cost of the care for sickness affect society as a whole. But, if the cost of sickness can be reduced by preventive measures, obviously it should be so prevented.

Still other factors that must at least be listed as contributing to the present trend in public health in this country are the medical services to soldiers during the World War and now the services rendered to the veterans of that war. Then, too, we must make mention of the medical services offered to the employees in large industries. These expressions of medical service in school, army and workshop, as Dr. Bossard points out, are responsible for a new social attitude towards health and health services. They have been largely responsible in determining the policy and the form of the present-day public health service.

One may well at this point repeat the question of Professor Beard: "Whither Mankind?" It is most important that we try to see clearly our position as practitioners of medicine and, if possible, lay our course for the future. In the opinion of Sir Arthur Newsholme, formerly Principal Health Officer of England, "Civilized communities have arrived at two conclusions from which there will be no retreat, though their full realization in experience has nowhere been completely achieved. In the first place the health of every individual is a social concern and responsibility, and secondly, as following from this, medical care in its widest sense for every individual is an essential condition for maximum efficiency and happiness in a civilized community."

The ideal of this viewpoint cannot be challenged. What must, however, be considered, and that most carefully, is the method by which such medical care for the masses is to be secured. Is it to be in the form of communism as in Soviet Russia? Is it to be in some form of socialism, as in Continental Europe? Are we to have state medicine, and will public departments of health be the agencies through which such service will be offered to the public? These are considerations that cannot be simply waved aside as of no consequence. We must realize, as Dr. Sigerist points out, that the history of the development of medical practice in the past shows that the physician's position in society was never determined by the physician himself, but by the society he was serving.

To what extent public opinion and action in the matter of public health service can be led along safe and constructive lines will depend largely upon what wise and purposeful leadership the medical profession can bring to the problem. Neither a policy of purposeless drifting nor one of violent opposition to all progress will serve the needs of the situation. A reasonable and constructive policy that will make medical service available to the average man at a reasonable cost must be worked out.

Fortunately it does not appear that there is any necessity for precipitate action. Surely the fear of the development of a communistic state in this country can be definitely put aside. The American spirit of self-reliance, which fortunately has largely survived the depression, and the facts that, as Mr. Frank R. Kent assures us, there are still 65,000,000 persons carrying private life insurance and 45,000,000 with independent savings accounts, are pretty good guarantees against a rapid spread of collectivism.

In the meantime the practices of public health will move chiefly in two main channels, namely, sickness prevention and health promotion. In both these fields public health will continue essentially in the rôle of a stimulator rather than a performer. To be sure, for the indigent sick public service must provide the care. However, public health subscribes to the physician-patient relationship and will readily surrender its part in the treatment of the indigent sick, provided an adequate plan* can be worked out to provide this service through the private physician.

It is in the field of health promotion that the big opportunity for the future lies. So far as public health is concerned, it functions in this field essentially through popular health instruction. It hopes to bring those who need service and those who can render service together. Its chief agency to accomplish this end is the public health nurse, who must, however, be especially trained to fulfil her function in this rôle effectively.

The practice of medicine, both private as well as public, has in the past very naturally expressed itself primarily in the form of curative medicine, that is, treatment that will deal with conditions that are frankly apparent. This still is largely the basis of medical practice today. However, we are fortunately in possession of diagnostic methods that enable us to recognize illness long before it may become obviously apparent. Early diagnosis is the ideal toward which we aim. Furthermore, it seems also possible, fortunately, by suitable medical procedures, to prevent entirely the occurrence of certain sickness and infections. Obviously we must seek to secure this protection wherever this is possible.

To inform the public regarding the possibilities of disease prevention and to urge the public to seek such protection either at the hands of the family physician, or where this is not possible, through public agencies, that is the rôle which public health has selected for itself. It must, in turn, be the responsibility of the medical profession to adopt more widely the methods of preventive practice and to work out methods whereby these services can be offered to the mass of the people at a cost that the average man can afford to pay. Along these lines it would seem that private practice and public health can develop without conflict, and for the general good of the public that must be served.

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* Such as the Medical Economic Security Administration for the District of Columbia, the so-called Washington Plan.

BIBLIOGRAPHY

Bastian, A.: Der Völkergedanke, Berlin, 1881.

Beard, C. A.: Whither Mankind. A Panorama of Modern Civilization. New York, Longmans, 1928.

Bossard, J. H. S.: A Sociologist Looks at the Doctor. Trans. Am. Acad. Political & Social Science, Feb. 7, 1934, p. 5.

Chadwick, E.: Report on the Sanitary Condition of the Laboring Population of Great Britain. London, W. Clowes & Sons, 1843.

Fisher, I.: Report on National Vitality, Its Wastes and Conservation. Bull. National Conservation Commission, Washington, 1909.

Hu Shih: Whither Mankind: Civilizations of East and West. New York, Longmans, 1928, p. 27.

Kent, F. R.: America is Conservative. American Mercury, 1935, **36**, 129.

Mommsen, T.: History of Rome. New York, Scribner, 1891.

Newsholme, A.: Medicine and the State: The Relation Between the Private and Official Practice of Medicine with Special Reference to Public Health. Baltimore, Williams & Wilkins, 1932, p. 29.

Sigerist, H. E.: The Physician's Profession Through the Ages. Bull. New York Acad. Med., 1933, **9**, 661.

Sudhoff, K.: Hygienische Gedanken und ihre Manifestation in der Weltgeschichte. (Translation by F. J. Stockman.) Ann. Med. Hist., 1917–18, **1**, 111.

Winslow, C.-E. A.: The Untilled Fields of Public Health. Science, 1920, **51**, 23.

THE NEW UNITED STATES PHARMACOPOEIA (U. S. P. XI) AND THE PUBLIC HEALTH

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Broadly defined, a modern pharmacopoeia is a book that has been compiled by medical men or by medical men and pharmacists, in which are listed the most useful and widely sanctioned drugs used in practicing the art of healing, together with directions for their preparation and standards for their purity and identification.* While a pharmacopoeia is primarily a guide for the physician and pharmacist, it exerts a beneficial influence upon the public welfare that is not wholly dependent upon the physician or pharmacist.

This concept is attested to by the fact that it is believed by many that the United States Pharmacopoeia was one of the most potent influences which prepared the way for Federal legislation relating to drugs; moreover, the work is now recognized as the standard authority in the enforcement of the so-called pure food and drug act.

In our era, drugs may rightly be regarded as instruments of precision when used wisely, this being due in no small measure to the rigid specifications in a pharmacopoeia such as that of the United States.

Although physicians today do not regard drugs as the *sine qua non* for either the prevention or treatment of disease as they did centuries ago, drugs may still be considered to be of prime importance as instruments in maintaining public health.

The eradication or control of the ravages of such diseases as malaria, syphilis, hookworm, typhoid, diphtheria, diabetes and certain types of heart disease, have been accomplished, to name only a few of the conditions in which they are of benefit after their proper use.

The pharmacopoeia had its beginning in the early dawn of recorded history, the first collection of medical formulas being found in the Ebers Papyrus, an Egyptian treatise written about 1552 B.C., but which is thought to contain material that was handed down from the time of Imhotep, the so-called Father of Egyptian Medicine.

Credit for compiling the first official pharmacopoeia has fallen to a gifted Prussian youth, Valerius Cordus (1515–1544), who, it will be recalled, was the first to describe the manufacture of anesthetic ether. The Cordus Pharmacopoeia was made official by the Senate of Nuremberg and was published in 1546, 2 years after the author's death. The work was widely used and passed through 35 editions and 8 translations.

The United States Pharmacopoeia was not the first in the United States, being antedated for almost a half century by the pharmacopoeia compiled by Dr. William Browne in 1778 for use in the military hospitals of the Continental Army. Its title was "Pharmacopoeia simpliciorum et efficaciorum, in usum noscomii militaris, ad exercitum Foederatorum Americae Civitatum pertinentis." It was a national work only in the military sense. The book contained 32 pages and listed 100 drugs, 84 of which were for internal and the remainder for external use.

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* This definition carries the implication that no drug whose origin or composition is unknown may be included.

Only two copies of this Pharmacopoeia are known to exist, one of which may be seen in the Surgeon General's Library of the United States Army in this city.

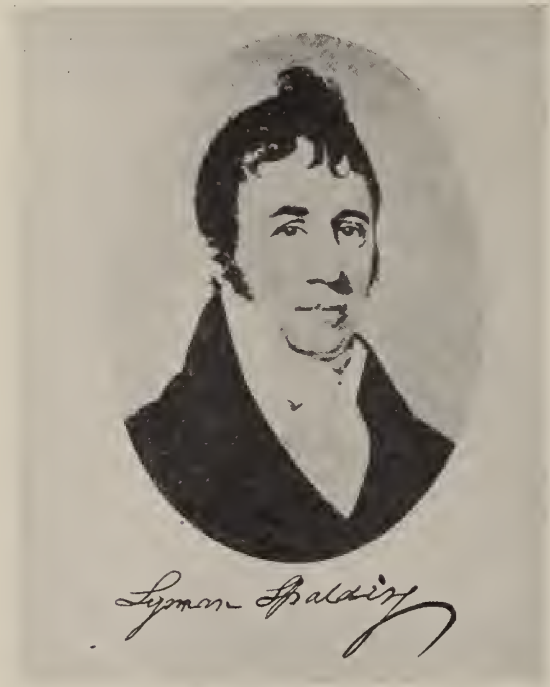

Lyman Spalding

Fig. 1. The Father of the United States Pharmacopoeia, Dr. Lyman Spalding (1775–1821), Teacher and Practitioner of Medicine; Innovator and a First Citizen during a Most Trying Period in Medical Education

The United States Pharmacopoeia (usually abbreviated to U. S. P.) as a national book of authority had its inception in the mind of Dr. Lyman Spalding of New York City, who in January, 1817, submitted to the Medical Society of the County of New York a project for the formation of a National Pharmacopoeia (Fig. 1). Up to that time European Pharmacopoeias were chiefly relied upon as authorities in the United States.

Dr. Spalding was well fitted for his task. He was well trained medically, a man of vision, and a successful practitioner with influential associations, among whom were Dr. Benjamin Waterhouse of the Harvard Medical School, who is perhaps best known as the "Father of Vaccination in the United States."

Spalding's project of 1817 led to the calling of a general convention which was held in the City of Washington in January, 1820. This convention, which consisted of delegates from regularly incorporated medical schools, state medical societies, and voluntary associations of physicians in territories having no incorporated medical schools or societies, authorized the publication of a national pharmacopoeia, the work being published in Boston and appearing on December 15, 1820, as the United States Pharmacopoeia.

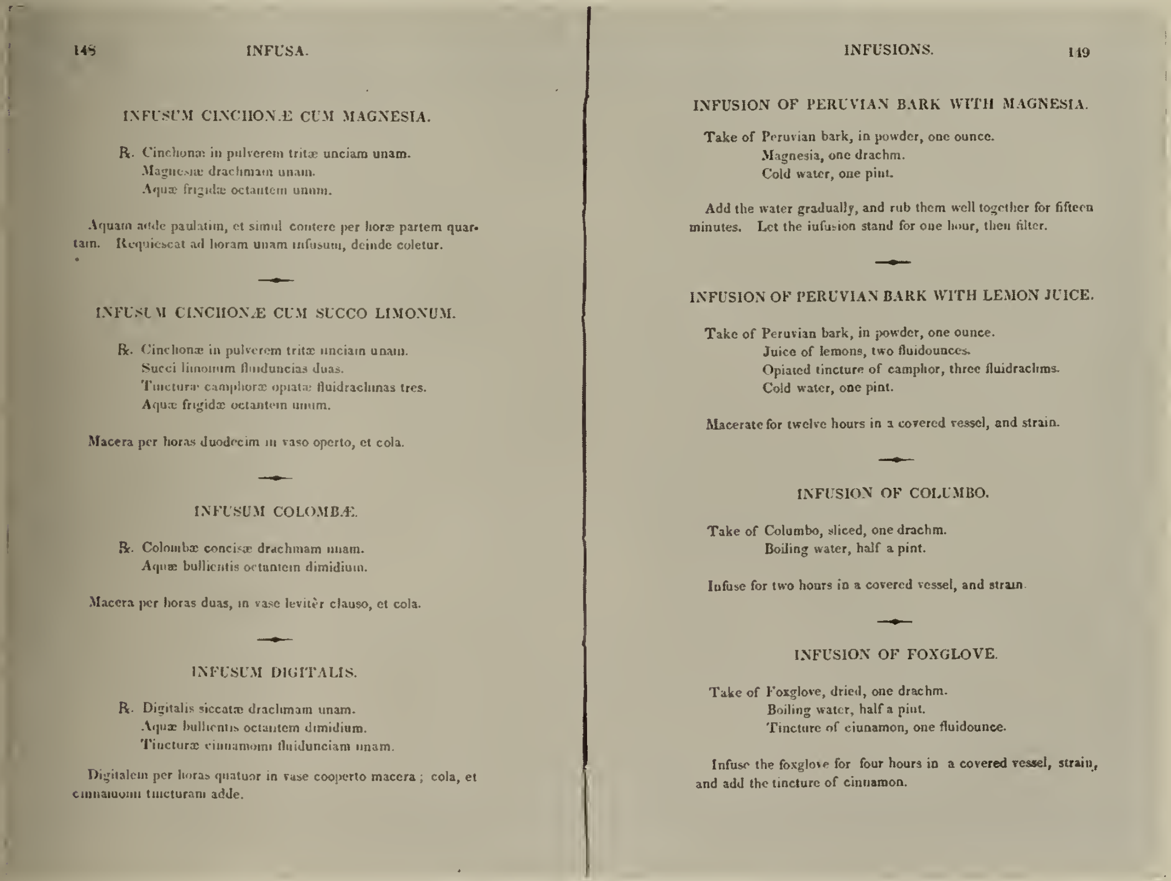
This work was a book of 272 pages in which Latin was used in the text, together with an English translation on the opposite page. The preface to this first edition stated the reasons for this to be as follows:

"Pharmacopoeias have most frequently been published in the Latin language. The Latin having long been the common language of scientific men, and the medium of technical phraseology, no well educated physician or apothecary is unacquainted with it. Its conciseness and precision have brought it into common use in the prescriptions of physicians and the formulae of medical writers. From the weight due to considerations of this sort, the publishing committee, while they have written out the entire work in English, have thought it proper to present, not only the nomenclature, but all the essential parts of the work in Latin also. They have further felt justified in this measure by the belief that the book is thus rendered more intelligible to foreigners, and more useful in those districts of the United States where the French and German languages continue to be spoken."

Latin was dropped from the descriptions in the text in the 1840 revision, having yielded to custom as the following quotation from the preface of this edition will show:

"The Convention of 1820 led the way in employing the vernacular language in the preparation of a National Pharmacopoeia; but yielded so far to previous custom as to present it also in Latin dress. It is but taking another step in the same direction to abandon the Latin altogether. There seems to be no sufficient practical advantage to counterbalance the inconvenience of attempting to present ideas in a language which has no appropriate words to express them, and the labor and expense incurred in printing twice as much matter as is necessary to convey the meaning intended. The recent publication, moreover, of the French Codex and the Edinburgh Pharmacopoeia in the vernacular languages of the two countries, respectively, gives the sanction of high authority to the course now pursued. But, though the English is used exclusively in all the directions and explanations of the U. S. Pharmacopoeia, it has been deemed best to retain the Latin names of medicines; as these are still very generally and advantageously employed in prescriptions." (Fig. 2).

The provision adopted by the first general convention, that a new convention should be held every 10 years in the city of Washington, D. C., for the purpose of revising the preceding issue, has been regularly carried into effect. The new United States Pharmacopoeia carries the Roman numerals XI to denote that it is the eleventh decennial revision through which it has passed.



148 INFUSA.

INFUSUM CINCHONÆ CUM MAGNESIA.

℞. Cinchonæ in pulverem tritæ unciam unam.
Magnesiæ drachmam unam.
Aquæ frigidæ octantem unum.

Aquam adde paulatim, et simul contere per horæ partem quartam. Requiescat ad horam unam infusum, deinde coletur.

◆

INFUSUM CINCHONÆ CUM SUCCO LIMONUM.

℞. Cinchonæ in pulverem tritæ unciam unam.
Succi limonum fluiduncias duas.
Tincturæ camphoræ opiatæ fluidrachmas tres.
Aquæ frigidæ octantem unum.

Macera per horas duodecim in vaso operto, et cola.

◆

INFUSUM COLOMBÆ.

℞. Colombæ concisæ drachmam unam.
Aquæ bullientis octantem dimidium.

Macera per horas duas, in vase levitèr clauso, et cola.

◆

INFUSUM DIGITALIS.

℞. Digitalis siccatæ drachmam unam.
Aquæ bullientis octantem dimidium.
Tincturæ cinnamomi fluidunciam unam.

Digitalem per horas quatuor in vase cooperto macera; cola, et cinnamomi tincturam adde.

INFUSIONS. 149

INFUSION OF PERUVIAN BARK WITH MAGNESIA.

Take of Peruvian bark, in powder, one ounce.
Magnesia, one drachm.
Cold water, one pint.

Add the water gradually, and rub them well together for fifteen minutes. Let the infusion stand for one hour, then filter.

◆

INFUSION OF PERUVIAN BARK WITH LEMON JUICE.

Take of Peruvian bark, in powder, one ounce.
Juice of lemons, two fluidounces.
Opiated tincture of camphor, three fluidrachms.
Cold water, one pint.

Macerate for twelve hours in a covered vessel, and strain.

◆

INFUSION OF COLUMBO.

Take of Columbo, sliced, one drachm.
Boiling water, half a pint.

Infuse for two hours in a covered vessel, and strain.

◆

INFUSION OF FOXGLOVE.

Take of Foxglove, dried, one drachm.
Boiling water, half a pint.
Tincture of cinnamon, one fluidounce.

Infuse the foxglove for four hours in a covered vessel, strain, and add the tincture of cinnamon.

Fig. 2. Parallel Pages from the United States Pharmacopoeia of 1820
Not one of these preparations, as such, is official today

It is therefore seen that the term U. S. P. does not imply that the work is the product of our national government. It is a national work in a geographical sense only, the current revision being the composite labors of a group largely composed of medical and pharmaceutical scientists, selected from delegates who come from all parts of the nation. It acts, however, as an incorporated body, but with no direct governmental control. In this latter respect it is unlike certain others, such as the British Pharmacopoeia, which is authorized by Act of Parliament. As before mentioned, however, each revision of the U. S. P. is adopted by our federal government as its book of specifications for the drugs named therein, in its enforcement of the Pure Food and Drug Act of June 30, 1906.

Although the U. S. P. XI was issued in December of last year, the date fixed by the Convention on which it is to supersede the previous revision is June 1, 1936; this will enable all manufacturers and pharmacists to restock and recheck their preparations in accordance with the new revision.

The United States Pharmacopoeial Convention, which was called for the revision of the U. S. P. X, met in Washington, May 13, 1930, and was presided over by the president, Dr. Reid Hunt, of Harvard University.

In accordance with recent custom, the convention selected by ballot a group of 50 from among the several hundred delegates, the group to act as a committee of revision and to be known as the General Committee. Of this general committee 18 represented the science of medicine, the remainder the science of pharmaceutical chemistry.

Previous to the convention of 1850, the science of pharmacy had no representation on the committee, the work being done wholly by physicians. In 1840 a group of pharmacists voluntarily gave assistance to the committee; their assistance was considered so valuable to the committee that the science of pharmacy was invited to send delegates to the 1850 convention, some of whom were elected to the committee. Since then the science of pharmacy has been fully represented at each convention.

From the general committee of 50, 15 subcommittees were formed, having been named as follows: Scope; therapeutics and pharmacodynamics (including posology); biological assays; biological products and diagnostic tests; botany and pharmacognasy; proximate assays; inorganic chemicals; organic chemicals; reagents and test solutions; volatile oils; extracts, fluid extracts and tinctures; waters, solutions, spirits, syrups and elixirs; cerates, ointments and miscellaneous galenicals; tables, weights and measures; nomenclature.

From the standpoint of the relation of the U. S. P. to therapeutic progress the committee on scope is perhaps the most important subcommittee. This subcommittee comprised the 18 members of the general committee who represented medical science, together with 5 others selected from the pharmaceutical group.

The present policy is that adopted by the General Committee of Revision at the convention of 1920 and reaffirmed by the 1930 convention, namely, that the physicians of the committee be given the responsibility for the admission of therapeutically active substances, the pharmacists those of pharmaceutical necessity.

Among the principles adopted by the convention of 1930 was one which stated that the object of the U. S. P. XI was "to provide standards for drugs and medicines of therapeutic usefulness and pharmaceutic necessity and to insure so far as practicable, uniformity in physical properties and active constituents." Further "no substance or combination of substances shall be introduced if the composition or mode of manufacture thereof be kept secret." This principle, therefore, embodied the ideals laid down by the first convention which brought forth the United States Pharmacopoeia.

An important feature in the plan of the new revision was to elect auxiliary members to subcommittees because of their expert ability in a particular field of activity. This plan was first adopted by the 1920 convention, and having been found a valuable aid in revision it was adopted by the 1930 convention. About 200 non-voting auxiliary members assisted the subcommittees of revision XI.

An entirely new feature was the plan to publish "interim revision" supplements which may admit new drugs or revise the material in existing monographs, so as to reflect the advances made in medical science at once, thus eliminating the lag due to the 10-year revision plan. It is not unlikely that such supplements will be issued annually.

A notable change in the eleventh revision that will seem strange to many is the adoption of a new spelling for sulphur and words derived from sulphur, so as to conform to the modern usage of chemical science; sulphur becomes sulfur; sulphate and sulphite become sulfate and sulfite respectively. The inclusion of the structural as well as the condensed formula for organic compounds will be especially welcomed by the pharmaceutical chemist.

The United States Pharmacopoeia has been the leader throughout the world in requiring bio-assays for drugs whose activity could not be determined by chemical means. The Federal Food and Drug Administration during the last decade voluntarily served as the agent for the distribution and preparation of reference standards for drugs requiring bio-assay. This responsibility has now been taken over by the Board of Trustees, who will distribute the standards through the office of the Chairman of the Committee of Revision, from whom reference standards for the following may be obtained by all who apply; they include aconite, ergot, digitalis, strophanthin, posterior pituitary, pepsin, and vitamins A and D.

There are 119 articles that are no longer official in the recent pharmacopoeia but which were listed in the U. S. P. X; in fact, some are to be found in the primary list of the first pharmacopoeia of 1820, among them being cubebs, colocynth, lobelia, phosphorus, quassia, senega, ulmus (slippery elm) and ura ursi (barberry).

This list of deletions may appear to contain some worth while remedies, as it unquestionably does, but when it is found that the preparation deleted has one or more pharmacopoeial substitutes which will answer all the purposes of the deleted article, it may be concluded that its omission will not result in any loss to scientific medicine. Notable among such deletions are the following: Crude tetanus antitoxin, which is replaced with the purified product; cinchophen with neocinchophen, the latter having fewer side effects. The hydrochlorides of both morphine and pilocarpine have been deleted because other wholly satisfactory salts have been retained. Redundancy in the previous pharmacopoeia was especially manifest among the iron and quinine preparations. The list of deletions includes many of such preparations for no other reason than that of simplicity.

The weakness of most pharmacopoeias is the duplication in the list of drugs admitted, the number admitted always being much less than the number which the physician actually employs; yet if a favorite drug has been deleted because another has been retained, even though it has been found to be a complete substitute for the deleted article, the pharmacopoeia has lost some of its goodness to certain practitioners, and their interest in the work may lessen.

The additions to the U. S. P. XI number 58,* or about one-half of the number deleted from the U. S. P. X. This makes the U. S. P. XI contain 568 titles, 430 of which were admitted on account of their therapeutic usefulness, the remainder because of their pharmaceutic necessity. The present trend of revision as regards number of articles made official is thus seen to be downward, the present work having fewer than the former by about 60 titles.

Leaving out of consideration the refinements that have been made in the requirements of each article for purity and uniformity of composition, which have been most numerous, one may to a very fair degree judge of the merits of the new work by a consideration of the articles admitted. Forty of the 58 newly admitted articles have the letters N. N. R. placed at their right to signify that they have had the approval of the Council of Pharmacy and Chemistry of the American Medical Association, which has included them in their book of proprietaries, the New and Nonofficial Remedies (N. N. R.). This means that when a proprietary article has been accepted by this council, it is

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* This list appears on page 334 of the December, 1935, number of the Annals.

TABLE 1

ARTICLES OFFICIAL IN THE U. S. P. X BUT NOT ADMITTED TO THE U. S. P. XI

Aconitina
Antitoxinum Tetanicum Crudum
Aqua
Benzaldehydum
Buchu
Calcii Glycerophosphas
Calumba
Calx
Calx Chlorinata
Cambogia
Carbo Ligni
Cimicifuga
Cinchonidinae Sulphas
Cinchophenum
Colchici Cormus
Colocynthis
Cotarninae Chloridum
Cubeba
Elaterinum
Emplastrum Capsici
Emplastrum Plumbi Oleatis
Eucalyptus
Extractum Colchici
Extractum Colocynthidis
Extractum Colocynthidis Compositum
Ferri Carbonas Saccharatus
Ferri Chloridum
Ferri Phosphas Solubilis
Ferri Sulphas Exsiccatus
Ferri Sulphas Granulatus
Fluidextractum Belladonnae Foliorum
Fluidextractum Buchu
Fluidextractum Cimicifugae
Fluidextractum Cinchonae
Fluidextractum Colchici
Fluidextractum Eucalypti
Fluidextractum Granati
Fluidextractum Hydrastis
Fluidextractum Hyoscyami
Fluidextractum Rhei
Fluidextractum Rhois Glabrae
Fluidextractum Rosae
Fluidextractum Scillae
Fluidextractum Senegae
Fluidextractum Uva Ursi
Gambir
Glyceritum Phenolis
Granatum
Guaiacolis Carbonas
Hydrargyri Iodidum Rubrum
Hydrastis
Hyoscyaminae Hydrobromidum
Infusum Digitalis
Ipomoea
Jalapa
Krameria
Linimentum Calcis
Liquor Arseni et Hydrargyri Iodidi
Liquor Ferri et Ammonii Acetatis
Liquor Plumbi Subacetatis
Liquor Potassii Citratis
Liquor Potassii Hydroxidi
Liquor Sodae Chlorinatae
Liquor Sodii Hydroxidi
Liquor Zinci Chloridi
Lobelia
Maltum
Manna
Morphinae Hydrochloridum
Mel Rosae
Oleoresina Capsici
Oleum Cajuputi
Oleum Cari
Oleum Tiglii
Paraformaldehydi
Pepo
Phosphorus
Pilocarpinae Hydrochloridum
Pilulae Asafoetidae
Pilulae Hydrargyri Chloridi Mitis Compositae
Pilulae Phosphori
Plumbi Monoxidum
Pulvis Japalae Compositus
Pulvis Rhei Compositus
Quassia
Quininae Hydrobromidum
Quininae Hydrochloridum
Quininae Tannas
Resina Ipomoeae
Resina Jalapae
Rhus Glabra
Rosa
Salicinum
Senega
Sodii Indigotindisulphonas
Strontii Salicylas
Strophanthus
Sulphonmethanum
Syrupus Rhei
Syrupus Scillae Compositus
Syrupus Senegae
Syrupus Zingiberis
Tinctura Asafoetidiae
Tinctura Calumbae
Tinctura Cardamomi
Tinctura Cinchonae
Tinctura Gambir Composita
Tinctura Krameriae
Tinctura Lobelia
Tinctura Rhei
Tinctura Strophanthi
Tinctura Valerianae Ammoniata
Tinctura Zingiberis
Trochisci Acidi Tannici
Trochisci Ammonii Chloridi
Ulmus
Unguentum Iodoformi
Unguentum Plumbi Oleatis
Uva Ursi

TABLE 2

ADDITIONS TO U. S. P. XI

Latin Title	English Title
Acriflavina*	Acriflavine
Acriflavinae Hydrochloridum*	Acriflavine Hydrochloride
Aethylenum*	Ethylene
Aethylhydrocupreinae Hydrochloridum*	Ethylhydrocupreine Hydrochloride
Aethylis Oxidum	Ethyl Oxide (Reagent ether)
Antitoxinum Scarlatinae Streptococcicum*	Scarlet Fever Antitoxin
Bismuthi et Potassii Tartras*	Bismuth and Potassium Tartrate
Calcii Creosotas*	Calcium Creosotate
Calcii Gluconas*	Calcium Gluconate
Calcii Hydroxidum	Calcium Hydroxide
Carbo Activatus	Activated Charcoal
Carbonei Dioxidum	Carbon Dioxide
Chlorobutanol*	Chlorobutanol (Chloretone)
Digitalis Pulverata	Powdered Digitalis
Emulsum Petrolati Liquidi (50 per cent)	Emulsion of Liquid Petrolatum
Ephedrina*	Ephedrine
Ephedrinae Hydrochloridum*	Ephedrine Hydrochloride
Ephedrinae Sulfas*	Ephedrine Sulfate
Erythritylis Tetranitras Dilutus*	Diluted Erythryityl Tetranitrate (Erythrol)
Extractum Hepatis*	Extract of Liver
Ferri et Ammonii Citrates Virides*	Green Iron and Ammonium Citrates
Fluoresceinum Solubile*	Soluble Fluorescein
Histaminae Phosphas	Histamine Phosphate
Hydrargyri Succinimidum*	Mercuric Succinimide
Iodophthaleinum Solubile*	Iodophthalein
Liquor Ergosterolis Irradiati*	Solution of Irradiated Ergosterol (Viosterol)
Liquor Hepatis*	Solution of Liver
Liquor Hepatis Purificatus*	Purified Solution of Liver
Liquor Histaminae Phosphatis	Solution of Histamine Phosphate
Liquor Parathyroidei*	Solution of Parathyroid
Liquor Sodii Hypochloritis*	Solution of Sodium Hypochlorite
Merbaphenum*	Merbaphen (Novasurol)
Neocinchophenum*	Neocinchophen (Neoatophan)
Oleum Iodatum*	Iodized Oil
Oleum Maydis	Corn Oil
Oleum Morrhuae Non-destearinatum	Non-destearinated Cod Liver Oil
Oleum Rosae	Oil of Rose
Phenacainae Hydrochloridum*	Phenacaine Hydrochloride
Phenobarbitalum Solubile*	Soluble Phenobarbital
Pulvis Chiniofoni*	Chiniofon Powder
Serum Antimeningococcicum*	Antimeningococcic Serum
Serum Antipneumococcicum 1*	Antipneumococcic Serum Type I
Sodii Perboras	Sodium Perborate
Sodii Stearas	Sodium Stearate
Stomachus*	Stomach
Tabellae Glycerylis Trinitratis	Tablets of Glyceryl Trinitrate (Nitroglycerine Tablets)
Theophyllina cum Ethylene-diamina*	Theophylline with Ethylene Diamine
Theophyllina et Sodii Acetas*	Theophylline and Sodium Acetate
Tinctura Iodi Mitis (2 per cent)	Mild Tincture of Iodine
Toxinum Diphthericum Detoxificatum*	Diphtheria Toxoid
Toxinum Diphthericum Diagnosticum*	Diphtheria Toxin for the Schick Test
Toxinum Scarlatinae Streptococcicum*	Scarlet Fever Streptococcus Toxin
Toxitabellae Hydrargyri Bichloridi Parvae	Small Poison Tablets of Mercuric Bichloride
Tryparsamidum*	Tryparsamide
Tuberculinum Pristinum*	Old Tuberculin
Vaccinum Rabies*	Rabies Vaccine
Vaccinum Typhosum*	Bacterial Vaccine made from the Typhoid Bacillus
Vaccinum Typhosum-Paratyphosum*	Bacterial Vaccine made from the Typhoid Bacillus and Paratyphoid "A" and "B" Bacilli

* N. N. R.

listed in New and Nonofficial Remedies together with statements relating to the evidence upon which it was admitted or which demonstrates its continued eligibility and a description of its character and composition.

Among the titles in this group there is one article of importance which is not to be found in the last N. N. R., namely, histamine which the U. S. P. XI lists both as the sulphate and its solution. Histamine was formerly listed in the N. N. R. from 1916 to 1921 when it was required for the standardization of posterior pituitary solution. It is now used chiefly for differentiating organic from functional achylia gastrica, and is, therefore, of importance as a diagnostic agent. Others of such additions are but slight modifications either of official or previously official products, among which are: Ethyl oxide or reagent ether; calcium hydroxide; activated charcoal, which has been substituted for wood charcoal; emulsion of liquid petrolatum; non-destearinated cod liver oil; tablets of nitroglycerine; mild tincture of iodine, and small poison tablets of mercuric chloride.

Perhaps a few words of explanation should be made concerning the admission of a second tincture of iodine. The old tincture of iodine (Tincture Iodi) is still retained and is essentially a 7 per cent solution of iodine in alcohol. The stronger or old tincture is strongly irritant and most useful for producing counterirritation; the new or mild tincture of iodine is especially adapted for skin and wound antisepsis and as a first aid dressing for wounds. Its extensive use for the latter purpose made necessary the inclusion of the mild preparation.

The number of biological products has been considerably increased over that of the previous revision. The list now includes 3 antitoxins, 2 serums, 4 toxins and 4 vaccines.

All biological products are controlled, through an act of Congress, by the National Institute of Health of the United States Public Health Service, hence this Institute, as before, has provided the English titles and standards for all such products.

It will surprise many to find that insulin which is admittedly an excellent agent for the treatment of diabetes, does not appear in the list of admissions. This product as well as a few others, were admitted by vote of the committee. However, patents exist upon them and until this interference is removed by the expiration of the time limit of legal protection, they may not be included. The interim revision supplement plan will undoubtedly take care of such important therapeutic agents at that time. Such a situation causes one to wonder whether a patent on a medicinal product is ever justified. In 1846 Morton patented the use of ether for producing surgical anesthesia. It will be recalled that this patent was abrogated by its extreme unpopularity. Hence many today, like Simpson, are asking: "Are we drifting away from the fine spirit of our fathers? Is the beneficent altruism of the old masters in danger of being lost?"

Changes in names other than in sulphur and its derivatives, without any change in their composition, have been made in 25 preparations, being done "for the purpose of insuring greater accuracy, brevity or safety in dispensing; or conformity with international usage, and to eliminate therapeutically suggestive titles." Most of such changes have been minor. For example, corrosive mercuric chloride is now termed mercury bichloride; solution of hydrogen dioxide has the new name of solution of hydrogen peroxide. Compound powder of licorice becomes compound powder of senna, since senna is its most active constituent; compound mixture of licorice (Brown Mixture) becomes compound mixture of opium and licorice, thus placing emphasis on the opium content of the mixture.

No drastic changes in formulas have been made. The formulas for many ointments have been changed in composition, without materially altering the percentage strength of the active constituents. The principal change in this class of preparations has been the substitution of wool fat, wax and petrolatum for the relatively unstable benzoinated lard. This change not only imparts greater permanency to such ointments but permits through the use of wool fat the introduction of liberal amounts of water into the mixture.

Fowler's solution has been modified slightly in composition; it is now practically neutral in reaction and is entirely free from color. The alkalinity of the former solution gave rise to many incompatabilities; the color seems to have been added merely to imitate an old proprietary article. The strength of the new preparation, however, remains the same as formerly.

Such in brief are some of the more prominent features of the newly revised United States Pharmacopoeia. Ever since its inception in 1820 it has been a valuable *vade mecum*, both for the student and the practitioner of medicine. It is safe to predict that the present revision will be more valuable to them than any of its predecessors.

Unfortunately the practitioner of the healing art occasionally yields to influences which have made it appear to him that the Pharmacopoeia is an obselete work and that the new remedy or "specialty" is an improvement over the official pharmacopoeial product. Fortunately, however, the specialty has not been making great inroads into the practitioner's therapeutic armamentarium. Specialties are seldom improvements over the well tried official remedies, in fact most of them are new in name only.

A very cogent reason why the drug manufacturer promotes the sale of specialties is that the U. S. P. preparations are on a price competitive basis, which makes them less profitable merchandise than the specialty that is sold with a protective trade-marked name. In Canada, for example, where the National Health Insurance is in force, physicians rely more than formerly on the Pharmacopoeia, whose drugs are cheaper, yet no one there has found that the patient's treatment has been inadequate on this account. It has been shown that in some instances the price increase of an official product under a trade name is as much as 400 per cent.

In these days of increasing socialistic activites and more extensive distribution of "debunking" literature it may not be long until the patient becomes more fully aware than formerly of the value of the Pharmacopoeia to his welfare, and he may then become the mainspring to force the tardy physician to the more extensive use of the U. S. P. drugs.

The Pharmacopoeia may rightly be regarded as a major public health project, in which technical experts on the science of medicine, both chemical and experimental, have joined forces with the science of pharmacy, to give to the world a book of standards for the guidance of the pharmacist and physician in the treatment of disease that is the peer of its kind throughout the world.

There is no cult represented in the Pharmacopoeia, which makes it likely that it will continue to adopt the findings of modern science and remain a chief landmark in the advancement of scientific medicine.

GENITO-URINARY TUBERCULOSIS

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At a time when the tuberculosis problem of this community is receiving so much attention, it is most appropriate that the problem of genito-urinary tuberculosis should receive some of our attention. Genito-urinary tuberculosis is a very definite part of the tuberculosis problem, and unfortunately in the past has had entirely too little attention given it.

There are several facts which stand out in this problem: (1) Genito-urinary tuberculosis should practically never be considered as a pathological entity separate from the rest of the body as a whole; (2) the same fundamental principles that apply to pulmonary tuberculosis apply to the treatment of genito-urinary tuberculosis, with the exception that this type of infection is a serious menace from the contagious viewpoint; (3) tuberculous lesions of the genito-urinary tract have the same possibilities of healing and arrest as tuberculous lesions in any other portion of the body. This portion of the body is involved in tuberculous infection during the most active part of the individual's life, namely, in the second, third and fourth decades.

Urinary tuberculosis will be considered first. The typical case of urinary tuberculosis is that in which the course is approximately as follows. In an individual who may have other lesions or may be healthy and of average physical vigor there will be some slight discomfort in one of the renal areas, and gradually increasing frequency of urination, dysuria and often nocturia, with or without the presence of hematuria. For this frequency and dysuria the commonly used measures for the treatment of cystitis result in either partial or complete failure to relieve symptoms. The patient goes from bad to worse until finally stains for tubercle bacilli or urographs demonstrate the presence of the tuberculous lesion in either or both kidneys. Now, besides this typical case there are all types and variations. There is the case with no subjective symptoms whatever but with marked pyuria or pronounced hematuria. Then there is the case with an unusual amount of renal pain and possibly very severe renal colic. These various types may occur either along with pulmonary, glandular, osseous, or cutaneous manifestations or long after such conditions may have existed.

Some emphasis should be laid on the importance of certain types of diagnostic examinations. When tuberculosis exists in a kidney, the urine should be found to contain tubercle bacilli by careful staining methods (with emphasis on 'careful') in at least 90 per cent of the cases. However, not less than 3 specimens should be stained, and in some instances, when one has any reason to feel that tubercle bacilli should be present, even 10 or more stains may very reasonably be made. It is a noteworthy fact that the incidence of positive urine-staining examinations is directly proportional to the experience of the technician who does the work. Cultural studies of urine have been very successful in the hands of some technicians, but in most communities, as in our own, this method has not been satisfactorily carried out. The result of guinea-pig inoculation for the diagnosis of urinary tuberculosis is also directly proportional to the manner in which the inoculations are carried out. It would not be exaggerating to say that 50 per cent of negative guinea-pig reports are worthless because of totally inadequate technic. Urography offers much in recognizing tuberculous lesions of the kidney and also offers much in following the course of the infection in the individual case. The intravenous urogram offers a method much less distressing (when the dye is concentrated sufficiently) than the old retrograde injection.

The handling of urinary tuberculosis calls for considerable conservatism and judgment as to what measures should be instituted and when. In general the lack of the necessity for haste of surgical attack should be very strongly emphasized. A kidney which shows little or no parenchymatous destruction should very rarely be the object of nephrectomy unless the bladder distress has developed to such an extent that rest is seriously interfered with. It is very important to allow the individual to demonstrate his degree of resistance before instituting surgical treatment. During this period the patient should have exactly the same care as if he had an acute pulmonary lesion; that is, he should have bed rest and all of the general measures which are used to increase resistance and conserve energy. There is no phase of the treatment that is more important than this. Should the parenchymatous involvement be found to be progressive, nephrectomy is definitely indicated and justified. After nephrectomy, regardless as to whether tuberculous lesions are present or not, sanatorium care is the ideal postoperative care for at least a year, and during this period the patient should not be subjected to the serious hazard of being in the same space with open tuberculous lesions. It would be far better for him to be at home, or engaging in moderate activity, than to be subjected to such a hazard as this. If all individuals who have nephrectomy performed could have this postoperative care, our results would be at least twice as satisfactory as they are with the care most usually instituted. It is an interesting observation that tuberculosis occurring in the remaining kidney, after nephrectomy has been performed for tuberculosis in the other, shows a very definite and satisfactory tendency to heal with proper sanatorium care. In bilateral renal tuberculosis sanatorium care is the best plan of treatment, except when the destructive process in one kidney is so extensive that there is entirely too much of a load of tuberculous infection to be reasonably carried by the individual, and in such case it is justifiable to remove such a kidney.

Genital tuberculosis, meaning tuberculous involvement of the prostate, seminal vesicles, epididymis, or testicle, is in most instances secondary to urinary tuberculosis and occurs in probably about 20 per cent of the cases of urinary tuberculosis. The treatment of genital tuberculosis varies markedly in different institutions, but in most cases conservatism is the best. Radical surgery as regards the prostate and vesicles has not been satisfactory in most instances. Removal of infected epididymes seems to be the most favorable of the surgical procedures and is justified if the individual is experiencing any great amount of discomfort, or if the process seems to be rapidly progressive.

The handling of the bladder involvement is one of the most difficult problems that have to be dealt with. The procedures used include the following: (1) Oral administration of various urinary antiseptics; (2) bladder lavage with various types of antiseptic solutions, including Rovsing's method, which consists of gradually increasing the percentage of aqueous carbolic acid solution from one-fourth up to 6 per cent; (3) the intracystic ultraviolet irradiation; (4) presacral neurectomy; (5) inguinal ureterostomy. It is very seldom that the bladder disturbances cannot be satisfactorily taken care of by one of the above procedures.

In concluding, the following points should be emphasized:

1. Urinary tuberculosis should be handled as a constitutional disease, and not as an infection that is wholly confined to the urinary tract.
2. Undue haste in surgical attack is practically never justified, since it is very important that resistance be built up and the course of the infection observed.
3. Great care should always be exercised in the details of all diagnostic procedures carried out for the recognition of the presence of urinary tuberculosis, so that the incidence of positive diagnoses may be made much more satisfactory than it is at the present time.
4. Sanatorium care before and after surgical treatment is of the most vital importance in the treatment of urinary tuberculosis.
5. Genital tuberculosis, with the exception of involvement of the epididymis, should in most instances be treated conservatively.
6. The distressing bladder symptoms may in most cases be fairly well controlled by one of the several methods which are at our disposal.
7. Every patient with cystitis who fails to respond in a reasonable period of time to the usual form of treatment should always be viewed with suspicion as possibly being the subject of urinary tuberculosis.

Poliomyelitis Following Vaccination Against This Disease.—During the past year in the United States, several thousand individuals, mostly children, have received subcutaneous and intracutaneous injections of treated poliomyelitis virus in the hope of acquiring immunity against the natural disease. . . . Though possibly subject to some correction, it is believed that the following statements represent closely the facts in each case:

1. A boy, age 5, had his first symptoms of poliomyelitis 6 days after receiving the 2d dose of vaccine A in the left arm, the 1st dose having been given in the same arm 27 days before the 2d. Paralysis began in the left arm the day after onset and death occurred after an illness of 3 days.

2. A girl, age 21 months, received the 2d dose of vaccine A in the right arm 12 days after the 1st dose, and the onset of poliomyelitis occurred 6 days after the 2d dose. Paralysis began in the right arm 3 days later, and death occurred in 5 days after onset.

3. A boy, age 4, had his onset of poliomyelitis 8 days after the 1st dose of vaccine A in his left buttock, and one day after the 2d dose at the same site. Paralysis began in his right leg 2 days later and is at present, after 3 months, confined to that extremity, though there is hope of ultimate nearly complete recovery.

4. A girl, age 8, had her onset of poliomyelitis 8 days after the 1st dose of vaccine A in her left arm, and one day after the 2d dose in the same arm. Paralysis began in the arm 2 days later, and death occurred after an illness of 3 days.

5. A boy, age 8, had his onset of poliomyelitis 8 days after the 1st and only dose of vaccine A in his left arm. Paralysis began in the right arm 2 days later, and remained as a deltoid paralysis at last accounts.

6. A boy, age 5, had his onset of poliomyelitis 9 days after the 1st and 2 days after the 2d dose of vaccine A in his arm. Arm paralysis began 2 days later, and death occurred after an illness of 3 days.

7. A boy, age 10, had his onset of poliomyelitis, 10 days after the 1st dose of vaccine A in his left arm and 3 days after the 2d dose in the same arm. Paralysis began in the right arm the next day, and death occurred after an illness of 3 days.

8. A girl, age 5, had her onset of poliomyelitis 11 days after the 1st dose of vaccine A in her right arm, and 4 days after the 2d dose in the left arm. Paralysis began in the left arm 4 days later and was still present at last accounts.

9. A girl, age 15 months, had her onset of poliomyelitis 13 days after the 1st and only dose of vaccine B in the abdomen and developed general weakness 4 days later, which persisted at last report.

10. A boy, age 5 months, had his onset of poliomyelitis 14 days after the 1st and only dose of vaccine B in the abdomen and paralysis was first noticed 9 days later. This paralysis persists at last report.

11. A girl, age 6, had her onset of poliomyelitis 14 days after the 1st, and 7 days after the 2d, dose of vaccine A in her arm. Paralysis began in the left arm 3 days later, and complete recovery was questionable at last report.

12. A boy, age 20, had his onset of poliomyelitis 14 days after the 1st and only dose of vaccine B in his abdomen. Paralysis began 2 days later, and death occurred after a 4-day illness. From this case poliomyelitis was transmitted to monkeys by Dr. J. F. Kessel.

Excerpts from News Letter, *U. S. Public Health Service, January 2, 1936.*

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(*Continued from December, 1935*)

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Encephalitis and Myelitis

Under this heading we group those manifestations of infectious processes that express themselves principally by lesions of the intrinsic tissue of the nervous system, the nerve cells of the brain and cord. In some of these conditions the etiological agent has been isolated, in others it has not. In all of them, however, there is definite evidence of infectiousness.

Syphilitic Encephalitis and Myelitis

Syphilitic infection of the central nervous system is never confined to any isolated portion of the brain or of the spinal cord but is, on the contrary, widespread. There is, however, at times a tendency for the infection to affect certain tracts or structures of the nervous system more than others, and the resultant clinical syndrome is then given a distinct name to accord with the pathological and clinical picture. It must be borne in mind that narrow clinical classification is not only difficult in many instances but dangerous as well.

DISSEMINATED SYPHILIS OF THE CENTRAL NERVOUS SYSTEM

Etiology. The etiology of this condition, as of other syphilitic diseases is, naturally, the spirochete of syphilis. There is no particular predilection for sex or for race, but it has a general tendency to appear somewhat earlier than other types of syphilis of the central nervous system. In common with other forms of neurosyphilis there is some evidence to suggest that the incidence of this type of disease is considerably higher in individuals who have received insufficient treatment than in those who have received none whatsoever. Another point in common with other types of nervous system syphilis is of extreme interest. It would appear, from data that are not as yet entirely conclusive, that patients who have been treated before the appearance of secondary skin manifestations, or who have had only slight skin rashes, have a distinct tendency to develop nervous system involvement. This has given rise to the theory that following extensive involvement of one ectodermal structure, the skin, immune bodies may be found that protect the other ectodermal structure, the nervous system.

Physiological and Pathological Considerations. There is always widespread involvement of the nervous system without any true pathological localization. Spirochetes are found scattered throughout the grey and white matter, there is cellular and axonal degeneration with ensuing phagocytosis and perivascular round-cell infiltration. Practically always a certain degree of vascular and meningeal involvement accompanies the parenchymatous degeneration. In view of the fact that the lesions are typically disseminated, the scattered clinical signs can be easily understood.

Symptoms and Signs. Subjective symptoms in disseminated nervous system syphilis depend to some degree upon the stage of involvement. Early in the disease they are quite apt to be vague and atypical. Headache, nervousness, irritability and so-called neurasthenic symptoms are the commonest. Diffuse paresthesias are not unusual. Epileptiform convulsions may precede or accompany any of the above. Ataxia usually appears fairly late, as do sphincter disturbances. The objective signs, too, are rather diffuse. Pupillary disturbances such as irregularity, inequality, and disturbance of reaction to light and accommodation are very frequent.

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* This is the fourth instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates. Other instalments will follow until completion.

The reflexes may be involved in a spotty fashion and become either increased or absent depending upon the location of the lesion. The blood Wassermann is usually positive, as is the spinal-fluid Wassermann. Lymphocytes are increased in the spinal fluid as well as the protein content, and variable changes occur in the colloidal gold curve. Cranial-nerve palsies from nuclear involvement are fairly common. Well marked mental symptoms are rather unusual, the physical disturbances being much more frequent and increasing in number and severity with the course of the disease. Transient weakness or even focal paralyses are often noted. Objective sensory disturbance, particularly diminution of the senses of pain and position, are also rather late signs. Loss of libido and potentia, often preceded by transient increase in sexual activity, is a common complaint.

Course and Prognosis. When untreated this type of disease is constantly progressive. The extreme picture is that of combined motor, sensory, emotional and intellectual deterioration. Complications such as pyelitis and trophic disturbances are common. Death frequently results from secondary infection such as pneumonia. It is quite probable that accidental death, resulting from the patient's mental or physical defects, is much more common than has been supposed.

The course of the disease can usually be favorably influenced by treatment, but a great deal depends upon the stage of the disease and other factors such as the age and general physical condition of the patient.

GENERAL PARESIS

Etiology. The spirochete of syphilis is again implicated, certain authors believing that a definite neurotropic strain is responsible. The condition usually appears from 10 to 20 years after the initial lesion, although there seems, of recent years, to be a tendency for this period to be shortened. With the exception of juvenile paresis it rarely appears before the age of 30 for obvious reasons. Men are affected more often than women, most probably because of greater exposure to infection.

Physiological and Pathological Considerations. The pathological picture is fairly typical. The convolutions, especially the frontal, are atrophied, and the sulci are deepened. There are increase of the subarachnoid fluid and some dilatation of the ventricles. The leptomeninges are thickened and adherent. The ependyma of the ventricles appears granular. The vascularity of the brain, particularly the cortex, is increased, and perivascular round-cell infiltration is widespread. There may be areas of softening secondary to vascular changes. The spirochete can usually be demonstrated in the brain substance by proper methods. The normal architecture of the cortex is disturbed, and a section under the microscope shows the typical 'wind-blown' appearance. Degeneration of ganglion cells and replacement by glia is constant. The marked involvement of the frontal lobes is usually held responsible for the equally marked clinical signs of mental impairment.

Symptoms and Signs. The outstanding clinical signpost of general paresis is the progressive mental deterioration. This is accompanied by varied physical manifestations obviously neurogenic, and by distinctive changes in the cerebrospinal fluid. The earliest symptoms are usually the mental, and of these abnormal irritability is the commonest. Another frequent complaint is of difficulty in concentration and unusual fatigability. The higher functions are usually impaired, and defects become apparent in the sphere of moral and ethical sense and of judgment. The general intelligence also suffers. Memory, both for recent and remote events, is practically always impaired. The individual becomes careless about his person and manners and extravagant in the use of money or of alcohol. Delusions and hallucinations appear almost invariably, but the oft-mentioned euphoria, expansiveness and ideas of grandeur are probably not as frequent as the older texts would lead us to believe. Manic outbursts, attacks of violence and delirium are very common. On the other hand, the depressed type may simulate a true depression and be accompanied by paranoid or hypochondriacal delusions. The simple dementing type presents the picture of combined gradual mental and physical deterioration without any of the usual dramatic features.

The physical signs are frequently characteristic, or at least suggestive. The Argyll Robertson pupil is very common, and some pupillary abnormality is eventually noted in practically all cases. Speech defects are also common and usually consist of slurring. There is tremor of the eyelids, lips, tongue and fingers. The deep reflexes are usually increased, the superficial reflexes diminished. Convulsions are frequent, often severe, and sometimes fatal, especially in cases of long standing. Paralyses of the transient type are often met with. The blood Wassermann is positive in a high percentage of cases, and the spinal-fluid Wassermann in about 95 per cent. Lymphocytes and protein are increased in the spinal fluid and the colloidal gold test always shows some change, frequently the so-called paretic gold curve with complete discoloration of the first tubes.

Course and Prognosis. The course of untreated general paresis is always downhill, although remissions may occur spontaneously. All of the symptoms and signs become more severe, and the patient usually degenerates to the vegetative level, to be carried off eventually by intercurrent infection.

TABES DORSALIS

Etiology. The etiology of true tabes dorsalis is always syphilitic, although other agents such as alcohol may simulate the picture fairly closely. The incidence of tabes in the course of syphilis is not high. As in general paresis there is some suggestion that mild or absent skin manifestations predispose to the condition.

Physiological and Pathological Considerations. The lesions in tabes are confined principally to the dorsal columns of the spinal cord and to the cranial nerves, especially the optic and oculomotor nerves. The initial lesion is probably at first an inflammatory involvement of the posterior spinal roots. Since the main attack of the spirochete in this case is directed toward sensory structures, the clinical manifestations may be expected to be principally in the nature of sensory disturbances.

Symptoms and Signs. These are legion, but certain of them are more characteristic than others. Pains and paresthesias are extremely common, may affect any part of the body, and are frequently severe. They frequently encircle the thorax and abdomen, varying in intensity from time to time. Objective sensory disturbances are also very common and show a predilection for certain areas. There is often diminished sensation to touch and pin-prick over the thoracic segmental distribution, the so-called tabetic cuirass. Pain on deep pressure over the tendo achillis and the testes may be lost. Vibration sense over the sacrum is often lost early in the disease with more widespread loss later on. Ataxia is a rather late but almost constant symptom and is dependent upon the loss of sense of position and of passive motion. It is at first most noticeable as swaying and uncertainty on closing the eyes and on walking in the dark. The ataxia may be brought out by attempting to touch finger to nose with the eyes closed. Normal tonic reflexes to the musculature are disturbed, and hypotonia is frequent. Deep reflexes, especially the lower ones, are decreased or lost. Trophic changes, such as perforating ulcers and arthropathies (Charcot joints), are rather unusual. In approximately 10 to 15 per cent of cases the optic nerve degenerates with resultant blindness. The oculomotor nerves too are frequently affected, giving rise to a variety of squints and ocular muscle paralyses. Ptosis is especially common. The Argyll Robertson pupil is found more frequently in tabes than in any other condition, although other pupillary abnormalities are frequently noted. Bladder disturbances are very common and vary from slight retention to a true "cord bladder." The blood Wassermann is positive in about 60 per cent of cases. The spinal-fluid Wassermann is practically always positive in the lower dilutions in early untreated cases but may become negative in old 'burnt-out cases.' Lymphocytes are usually moderately increased as well as the spinal-fluid protein. There is practically always some change in the colloidal gold curve in the first or the middle zones.

Course and Prognosis. The course is slowly progressive, although at times the condition may not appear to progress for many years. Bladder symptoms and ataxia, pains and trophic disturbances become worse. Pyelonephritis and pneumonia are the commonest immediate causes of death.

EPIDEMIC ENCEPHALITIS

Etiology. The definite etiological basis of epidemic encephalitis is still unknown. A number of investigators at one time believed the causative organism to be a pleomorphic streptococcus, but most of them have abandoned this view and now assume, probably on much better grounds, that it is a filtrable virus. At any rate, there is quite definite evidence that it can be transmitted to laboratory animals from infected humans, although no one has as yet been able to grow the organism in culture.

It is, apparently, a disease of recent origin, since, previous to von Economo's description of the epidemic of 1917 it was practically unknown. Both sexes, all races and all ages may be affected equally. Although originally epidemic in character it may now be considered to be endemic with sporadic epidemic manifestations. At one time it was thought to be a sequel or complication of influenza, with which it seemed to be associated, but little evidence can now be adduced to support this view. While it is unquestionably an infectious disease it is not highly contagious.

Physiological and Pathological Considerations. The infectious process affects all parts of the central nervous system to some extent, but shows a special predilection for the basal ganglia, subthalamic area and the midbrain structures. The microscopic picture is that of infiltration of the parenchyma with lymphocytes and plasma cells and degeneration of ganglion cells, particularly in the region of the substantia nigra. The clinical signs depend naturally on the location of the lesions and are, therefore, both focal and general.

Symptoms and Signs. Fundamentally, encephalitis is an acute infection of the central nervous system with, later, chronic manifestations. The acute manifestations have changed considerably in the course of the past 15 years. The onset during the first epidemic was characterized by lethargy and diplopia, followed by a rather shallow coma or stupor. In severe cases bulbar signs with disturbances of pulse, respiration and swallowing sometimes led to death. During other epidemics mental symptoms occurred, often of maniacal type, and insomnia, some rigidity of the neck and involuntary movements closely resembled meningitis. Delirium, hallucinations and inversion of the sleep mechanism were common. Various changes in the spinal fluid were reported. More recently cases have been reported in which cord symptoms were prominent. It is obvious that strict classification of the disease is impossible, but certain broad types may be differentiated. The classification suggested by Wechsler appears to be one of the most reasonable. He distinguishes 7 main groups as follows: (1) The lethargic group, presenting stupor and pupillary and ocular muscle disturbances; (2) the hyperkinetic group with various abnormal movements; (3) the psychotic group; (4) the basal ganglion group with early rigidity and tremor; (5) the meningitic group; (6) the bulbar group; (7) the neuritic group.

As a rule, there is only slight leukocytosis. The fever is rarely high. Spinal-fluid findings are not typical, the most constant findings being of slight increase in pressure and slight to moderate lymphocytosis. There is no lowering of sugar or chlorides, the former sometimes showing a slight increase.

Following the subsidence of the acute symptoms, so-called chronic or postencephalitic signs and symptoms may appear. The term 'chronic' should properly be applied to them, since, from pathological as well as clinical evidence, the disease is still active. The commonest of the chronic manifestations is in the nature of gradually increasing rigidity of the body associated with tremors of the head and limbs, loss of associated movements and increased salivation. The patients appear to be cut from a solid block and resemble somewhat the picture in advanced cerebral arteriosclerosis. In other cases various tics, spasms, twitchings, choreic and other involuntary movements appear. Various pupillary abnormalities may persist after the acute attack, and other disturbances of the visual apparatus may set in. Oculogyric crises, in which the eyes suddenly deviate in one direction and remain so for minutes or hours, may be extremely annoying. The mask-like facies with its blank expression and infrequent blinking usually accompanies the general rigidity. Respiratory anomalies of every variety have been described. The chronic encephalitic manifestations depend to some extent upon the age of the patient as well as the severity of the attack. Certain general rules may even be formulated. Very young children are apt to show severe symptoms of mental deterioration, amounting at times to moronity, imbecility and idiocy. Older children very frequently develop severe conduct disorders that may culminate in criminal acts. Adults are most prone to disturbances in muscle tone, referable to involvement of the extrapyramidal motor system.

Course and Prognosis. The course of acute encephalitis has changed considerably over a period of years. The early epidemics resulted in a rather high mortality, sometimes 20 to 25 per cent. More recent studies have shown a tendency toward a more benign course, although the incidence of chronic encephalitic sequelae has not been lessened. These latter may appear almost immediately after the acute attack, but in general a certain latent period intervenes, often as long as 4 or 5 years.

POLIOMYELITIS

Etiology. The etiological agent in poliomyelitis is almost unquestionably a filtrable virus. Monkeys may readily be inoculated, and develop typical clinical symptoms and pathological findings. Poliomyelitis has been described at all ages after 6 months but is predominantly a disease of children under 15 years, most often between the ages of 2 and 6 years. It is comparatively rare after the age of 30. It is usually met with in epidemic form, but isolated cases are fairly frequent. While more contagious than encephalitis it is not remarkably so. All races appear to be equally susceptible.

Physiological and Pathological Considerations. The virus very probably enters the body through the nasal passages, and again very probably passes through an early stage when it is a true generalized infection. Early symptoms of the disease as well as the finding of generalized enlargement of lymph glands are in favor of this statement. Quite soon, however, the infection shows its predilection for the grey matter of the anterior horns of the spinal cord. These areas become hyperemic and show leukocytic and lymphocytic infiltration and swelling and degeneration of anterior horn cells. The process sometimes involves the adjacent grey and white matter but never to the same extent. The resulting disturbance of function is, therefore, predominantly motor, of the lower motor neuron type.

Symptoms and Signs. The incubation period varies from 2 to 10 days. The onset is usually acute, sometimes preceded for a few hours or days by a prodromal period in which vague symptoms of malaise, abdominal pain or upper respiratory distress are complained of. Children become irritable and fretful, refuse food and sometimes vomit. Pains in the back, neck and head are especially common. The temperature is usually elevated but is seldom very high. This period seldom lasts for more than 48 hours when it is noticed that a flaccid paralysis of a portion of a limb or several limbs has appeared. The paralysis reaches its maximum usually within 1 or 2 days. The lower limbs are most frequently affected by the paralysis, which is rarely symmetrical. The back muscles, too are frequently involved, the trunk and upper extremities less often. One occasionally sees the ascending or Landry's type of paralysis which rapidly ascends until involvement of respiratory and cardiac centers results in death. On the other hand the disease may be limited, from the very onset, to the motor nuclei of the brain stem, with resultant paralyses of the musculature innervated by these nuclei.

Notwithstanding certain subjective sensory complaints, objective sensory findings are practically never found. The deep reflexes in the affected limbs are markedly diminished or completely lost. Kernig's sign is present to some degree in most cases. Atrophy of the affected muscles appears very early, and the electrical reactions of the muscles are disturbed, culminating in a complete reaction of degeneration. Abortive forms of poliomyelitis with only general systemic or very slight paralytic signs are frequently mentioned, but in view of the lack of specificity of prodromal symptoms and signs in the absence of paralysis, this condition can seldom be positively diagnosed.

The changes in the blood are of little diagnostic value. A mild leukocytosis is frequently present. The spinal fluid is seldom under increased pressure but does show other more suggestive findings. The protein content is constantly increased to a moderate degree. The cells found in the spinal fluid during the early stages (the first 24 to 48 hours) are predominantly polymorphonuclear leukocytes that soon give way to lymphocytes, rarely numbering over 500 per cu. mm. Sugar and chlorides may show a slight decrease or may remain normal. The serology is negative, and slight changes in the colloidal gold curve are of no significance.

Course and Prognosis. The course of the disease is fairly regular. Mortality varies somewhat, usually being under 15 per cent, most of the deaths occurring in the ascending type or in the bulbar type. The acute stage rarely lasts for more than 10 days. The initial paralysis is always much more extensive than the eventual residual paralysis, and recovery is often complete. It usually begins within a few days and proceeds more slowly as time goes on. Following arrest of the improvement, and sometimes before, certain secondary signs appear. These are in the nature of arrest of development of limbs, atrophy of bones, foot drop, contractures, particularly of the tendo achillis, and such deformities of the spine as lordosis and particularly scoliosis.

SYDENHAM'S CHOREA

Etiology. Sydenham's chorea is also known as infectious chorea and appears to have a definite relation to the rheumatic syndrome. It is especially common in children but may also be seen in young adults. Females are affected much more often than males. Various organisms, especially streptococci, have been found in the blood of choreics, and while no specific etiological agent can be implicated the infectious nature of the disease can hardly be doubted.

Physiological and Pathological Considerations. It is rare for cases of acute chorea to come to autopsy, but in the few reported the commonest findings are of small hemorrhages and emboli in the region of the corpus striatum. This localization coincides fairly well with the clinical symptoms that appear to be of extrapyramidal origin.

Symptoms and Signs. The onset of the disease is usually rather gradual with restlessness, 'clumsiness' and gradually increasing involuntary movements of the extremities. Writing is affected, and the gait becomes awk-

(*Continued on page 28*)

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THE TREATMENT OF PERIPHERAL VASCULAR DISEASES

Great strides have been made in recent years in the treatment of peripheral vascular diseases. A quarter of a century ago relatively little was known concerning these diseases and their treatment. Before Leo Buerger made his important contribution to our knowledge of thrombo-angiitis obliterans there was great confusion in diagnosis. Many cases of peripheral gangrene were called Raynaud's disease, a rare condition compared to Buerger's disease. Even today one hears the term endarteritis obliterans used almost universally, although the condition indicated is not an endarteritis at all but arteriosclerosis obliterans, in which thrombosis often inaugurates the gangrenous process.

A quarter of a century ago surgical amputation was the common treatment for the four main vascular diseases of the extremities: Thrombo-angiitis obliterans, arteriosclerosis obliterans, embolic occlusion and Raynaud's disease. Today, amputation is the last resort. Patient and persistent efforts to develop the collateral circulation in a gangrenous limb are often rewarded by success in saving the greater part of the limb. In Buerger's disease, or thrombo-angiitis obliterans, postural exercises, heat (with the light cradle), contrast baths (alternating hot and cold foot baths), specific protein therapy (usually with typhoid vaccine), intravenous injections of salt solution, and cessation of smoking have in many instances been productive of the development of an efficient collateral circulation. Many patients have come through with the loss, by spontaneous amputation, of only portions of one or more toes. The intravenous injection of typhoid vaccine has been particularly efficacious, and it has been the mainstay in alleviating the intense pain associated with the gangrene. In favorable cases lumbar ganglionectomy and ramisectomy have greatly aided in the opening up of collateral vessels. These vessels are apparently not newly formed ones but already existing ones which become dilated and more extensive in their distribution. The treatment of arteriosclerosis obliterans has not been so successful because of the usually advanced age of the patients and the extensiveness and severity of the vascular changes. Still, conservatism has been rewarded in many instances. Amputation should be avoided whenever possible, since removal of the limb above the knee is often necessary when it is resorted to, and high amputation is frought with a high mortality. The treatment of embolic occlusion is often successful by embolectomy or the use of vasodilators. Recently, papaverine intravenously injected has been advocated to overcome the vascular spasm which is such an important factor in the production of the gangrene following peripheral embolism. For Raynaud's disease, cervicodorsal ganglionectomy and ramisectomy for the upper extremities, and lumbar ganglionectomy and ramisectomy for the lower extremities have been highly successful.

Recently, intermittent pressure and suction has been advocated in the treatment of vascular disease, especially by Herrmann and Reid,[1] Landis and Gibbon,[2] and de Takáts.[3] The term "pavaex" has been proposed by Herrmann and Reid[4] for this treatment, the term signifying passive vascular exercise, the changes in pressure being gradual. Although Landis[5] advocates sudden changes in positive pressure and suction, the method of Herrmann and Reid has become more popular. Their apparatus, in the form of an air-tight glass or celluloid boot, is relatively simple and inexpensive. As with all new and relatively untried but promising forms of therapy, considerable enthusiasm has arisen for this method, and older and better established methods have been temporarily belittled. Allen and Brown,[6] however, have shown that these older methods should not be discarded and that perhaps they are as effective, if not more so, than this new mechanical method for developing collateral circulation. Further trial will indicate just how much is to be expected of this new method of treatment as compared to the older methods. One should, therefore, maintain an open mind in regard to "pavaex" until those endeavoring in large clinics to determine the exact value of this method have had ample opportunity to compare it with more simple methods in large series of cases. Undoubtedly, "pavaex" will be found to have a definite place in the treatment of peripheral vascular diseases, but without doubt also, it will be found to be only an additional aid among a number of other important modalities.

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[1] HERRMANN, L. G., AND REID, M. R.: The Conservative Treatment of Arteriosclerotic Peripheral Vascular Diseases; Passive Vascular Exercises (Pavaex Therapy). Ann. Surg., 1934, **100**, 750.

[2] LANDIS, E. M., AND GIBBON, J. H., JR.: The Effects of Alternate Suction and Pressure on Blood Flow to the Lower Extremities. J. Clin. Investigation, 1933, **12**, 925.

[3] DE TAKÁTS, G.: Obliterative Vascular Disease; Preliminary Report on Treatment by Alternating Negative and Positive Pressure. J. A. M. A., 1934, **103**, 1920.

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[4] HERRMANN, L. G., AND REID, M. R.: Pavaex (Passive Vascular Exercise) Treatment of Obliterative Arterial Diseases of the Extremities. J. Med., 1933, **14**, 524.

[5] LANDIS, E. M.: Observations on Diagnosis and Treatment of Peripheral Vascular Disease. Ann. Int. Med., 1934, **8**, 282.

[6] ALLEN, E. V., AND BROWN, G. E.: Intermittent Pressure and Suction in the Treatment of Chronic Occlusive Arterial Disease. J. A. M. A., 1935, **105**, 2029.

EDUCATION OF THE PROFESSION AND PUBLIC IN MEDICAL ECONOMICS

The American Medical Association has published and disseminated many important pamphlets and booklets on medical economics. It has set forth the facts of this important subject and has showed the pitfalls of the socialization of medicine. The latest booklet entitled "An Introduction to Medical Economics," an outline prepared by the Bureau of Medical Economics of the American Medical Association, is well worthy of perusal by all members of the medical profession. This booklet gives facts and figures, not merely theories. It is intended to present a differentiation between the economics of business, industry and commerce, and the practice of medicine. It is proposed for study by groups of practicing physicians and by students in medical colleges. Every physician should be cognizant of the facts and figures set forth and should be able to discuss the subject of medical economics intelligently.

TRANSACTIONS OF THE SOCIETY

Stated Meeting, January 8, 1936

The following were duly elected to membership:

Active Members

William Staton Anderson, 2010 R Street, N. W.
Louis Bernard Bachrach, The Farragut
George Lindsay Ball, 1301 Longfellow Street, N. W.
Jerry Keith Cromer, 1101 Massachusetts Avenue, N. W.
Elmer Wink Fugitt, 310 S Street, N. E.
Benjamin Golden, 1900 F Street, N. W.
Mabel Harlakenden Grosvenor, 2010 R Street, N. W.
Hugh Hudson Hussey, Jr., 3628 Warder Street, N. W.
Allen Edward L. Lee, 4707 Connecticut Avenue, N. W.
Isadore Levin, 3615 Warder Street, N. W.
Henry Anatol Monat, 1726 Eye Street, N. W.
Katherine Elizabeth Parker, 2900 Connecticut Avenue, N. W.
George Clemens Ruhland, 2708 Thirty-sixth Street, N. W.
Ralph Richards Stevenson, 1654 Columbia Road, N. W.
Donald Stubbs, 5308 Twenty-eighth Street, N. W.
James Winston Watts, 1028 Connecticut Avenue, N. W.
Hyman Blacker Weinberg, Burlington Hotel
Harry Samuel Weitzman, 1835 Eye Street, N. W.

Associate Members

Carl Preston Cline, D.D.S., The Farragut
Henry Clay Coburn, Jr., Walter Reed General Hospital
Ralph Andre Quick, Clarendon, Virginia.

Applicants for membership to be voted on in March, 1936:

For Active Membership

Garnet Walter Ault, University of Michigan—1931
Walter Willard Boyd, Harvard University—1928

Neil Porter Campbell, George Washington University—1931
Russel Jon Jansen, George Washington University—1926
Glen Pincock, George Washington University—1934
Mario Scandiffio, George Washington University—1928
Daniel Lamont Seckinger, Johns Hopkins University—1925
Maynard James Simmons, George Washington University—1903
Alexander Contee Thompson, Georgetown University—1911

Dropped, pursuant to provisions of Chapter IV, Article V, of the Constitution:

Active Members

Alfred L. Bou
H. Gladys Kain
William F. Patten
Edward J. Schwartz
*S. Ross Taggart

Associate Members

William F. Burke
Charles L. Smith
*William H. Wenger

* Request for reinstatement pending.

Group Hospitalization, Inc.

Representatives

Pursuant to resolution adopted by the Society, January 17, 1934, the following were duly nominated by the President, Dr. Sterling Ruffin, and elected by the Society:

W. M. Ballinger
Joseph B. Bogan
Caryl Burbank
Tomas Cajigas
William W. Chase
Arthur C. Christie
C. W. Culver
William T. Gill, Jr.
R. Arthur Hooe
LeRoy W. Hyde
Richard A. Kearny
Leon A. Martel
Russell McNitt
Albert E. Pagan
Philip O. Pelland
Alec A. Preece
F. A. Reuter
J. R. Verbrycke, Jr.

Amendments to the Constitution Adopted

1. Senior Delegate to the Federation of Citizens' Associations Becomes an Ex officio Member of the Executive Committee.

Chapter VII, Article II, Section 2. Omit the first "and," then insert before the word "*ex officio*," the following: "and the senior delegate to the Federation of Citizens' Associations,". Section 2 would then read:

> The Executive Committee shall consist of the President, Secretary-Treasurer, Delegate to the American Medical Association, the chairman of each Section, the chairman of each standing committee, the Managing Editor and Editor of the Society's publication, *and the senior delegate to the Federation of Citizens' Associations, ex officio,* and nine elective members. . . .

2. To prohibit members aiding and abetting lay persons from making monetary gain in medical practice.

Chapter IX, Article IV, add:

> Sec. 5. No member of the Society shall engage in any professional capacity whatsoever with any organization, group or individual engaged in the practice of medicine unless the Society has received proof that the profits from such practice inure to the benefit of members of the medical profession only.

Central Admitting Bureau for Hospitals

Representatives

The following were re-nominated to represent the Medical Society of the District of Columbia on the Board of Directors of the Central Admitting Bureau for Hospitals for the year 1936:

Prentiss Willson
Wallace M. Yater
Henry C. Macatee
Margaret M. Nicholson
Oscar B. Hunter
Arthur C. Christie
Sterling Ruffin
William H. Hough

Medical-Dental Service Bureau, Inc.

Representatives

The Directors of the Medical-Dental Service Bureau, Inc., for the year 1936, were nominated as follows:

Thomas A. Groover
Prentiss Willson
Henry C. Macatee
Oscar B. Hunter
William H. Hough
Wallace M. Yater
Coursen B. Conklin

Nine Physicians Obtain Life Membership

Through a constitutional provision, members of the Society on the active roster for 40 years become life members* and are no longer liable for dues or assessments January of each year the Annals prints additions to this Honor Roll. In the following tabulation the seniority number and date of entrance to membership are given:

172	George Burton Heinecke	April 11, 1895
173	Sofie A. Nordhoff-Jung	April 17, 1895
174	Charles Clagett Marbury	April 24, 1895

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* There are now 46 Life Members.

175	Albert Rhett Stuart	April 29, 1895
176	Charles McCauley Emmons	May 1, 1895
177	Thomas Ash Claytor	October 2, 1895
178	Lewis Junius Battle	October 3, 1895
181	Frederick O. Roman	October 7, 1895
186	Albert Livingston Stavely	October, 1895

These physicians are warmly congratulated and the hope is expressed that they will be on the rolls for many subsequent years.

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The regular meeting of the Washington Society of Pathologists was called to order at 1:35 P.M., December 7, 1935, in the Army Medical Museum by the President, Dr. Wallace M. Yater. There were 79 members and guests present. The minutes of the meeting of November 2, 1935, were read by the Secretary, and approved. Drs. R. R. Jones and Harry A. Davis were presented as guests of the Society.

Scientific Papers

1. "BRONCHIAL CARCINOMA." LANTERN-SLIDE DEMONSTRATION. **F. H. Foucar**, Colonel, Medical Corps, United States Army, Washington.

Among 1,096 autopsies upon adult white males there were 19 cases of bronchial carcinoma, representing 9.95 per cent of all cancers.

The possible etiological factors standing out in order of importance are influenza of the epidemic type, trauma, syphilis and the chronic pneumopathies. Quoting Huguenin: "Cancer of the lung occurs in direct proportion to the incidence of such lung pathology as causes a malpighian transformation—metaplasia—of the epithelium lining the bronchial tree."

The irritant which is the exciting cause of the epithelial transformation, may be infectious or mechanical. A considerable latent period is required in order to prepare the proper soil for malignant infiltration, and the onset of bronchial carcinoma is insidious and silent.

It is my opinion that all carcinomas of the lung arise from the epithelium lining the larger bronchi. Adenocarcinoma arising from the mixed glands of the myoelastic coat of the bronchi are not properly included among primary bronchial carcinomas. The two main cell types of bronchial carcinoma differ widely; the squamous type runs a longer course and usually remains localized in the thorax. The other cell type of bronchial carcinoma is more undifferentiated, and the growths are composed of round or oat cells. These cases run a more rapid course with widespread metastases.

The diagnosis of bronchial carcinoma rests almost entirely upon a careful correlation of the history and the subjective and objective findings. The X-ray picture is often overclouded by secondary pathology such as atelectasis, bronchiectasis and pleural effusion or exudate. X-ray films should be taken repeatedly. Bronchoscopy is the most exact diagnostic procedure, both as to the results of the examination of the bronchial lining and localization of the lesion; and especially as the means of obtaining tissue for microscopic examination.

2. "ROENTGENOLOGIC ASPECTS OF PRIMARY LUNG CARCINOMA." LANTERN-SLIDE DEMONSTRATION. **H. C. Pillsbury**, Colonel, Medical Corps, United States Army, Washington.

Primary malignant disease of the lung may occur either as a solid tumor with a sharply demarcated border or as an infiltrating tumor, with strands of malignant disease extending out into the lung tissue. I have several cases of the solid tumors of the lung.

In Case 1, the tumor was removed by Colonel Keller by the transthoracic route. No history is available at the Walter Reed General Hospital. It will be noted that the tumor is well demarcated, rounded, and is located well away from the hilus. The size is 17 x 15 x 12 cm. It is a neurofibroma and was connected by a pedicle with the pericardium. This is not a tumor of lung but is included on account of its similarity with other tumors.

Case 2 is an adenocarcinoma of the lung. Two points are of interest in this case. In the first place it will be noted that in the film there is no evidence of the carcinoma, but there is an erogenous cyst. One year later a definite nodular tumor has developed. This tumor also has sharply a demarcated outline and is solid. The left pleural cavity is entirely obliterated by adhesions, including the anterior portion. The surface of lung is studded with emphysematous bullae, and a single large bulla, 6 x 4 cm., projects from the anterior border of the upper lobe. No bullae are noted in the right lung. Necropsy showed a primary bronchial adenocarcinoma of mixed squamous and oat cells. There were metastases to the right adrenal gland and the brain.

Case 4 is a carcinoma originating in the hilus of the right lung in the upper lobe with involvement of the right parietal and visceral pleurae. There was direct extension to the tissues of the right chest wall. The duration was 19 months.

These large tumors of the lung very often show central necrosis. The necrotic tissue may be expelled through a bronchus, and there results a lung cavity that exactly resembles a pyogenic cavity. The tumor tissue casts the same shadow as does the inflammatory tissue in lung abscess cavities.

Case 5 is a carcinoma springing from the right eparterial bronchus. There has been central necrosis and cavity formation.

Case 6 is an abscess of the lung. It is to be noted that the shadows cast by the tissue surrounding the abscess cavity are exactly similar, both in the malignant and in the non-malignant conditions.

The infiltrative type of carcinoma is rather more distinctive than the solid type and is more easily diagnosed on the X-ray film. Cases 7, 8, 9, 10 and 11 are instances of this type. On the other hand, tumors of mediastinal origin may infiltrate into lung tissue and cast shadows that are very similar to the shadows of tumors arising originally from lung tissue.

Case 12 was a case of Hodgkin's disease. Case 13 is an instance of leukosarcoma of the mediastinum, lymphocytic type, with direct extension to the pleura. Case 14 is an instance of epidermoid carcinoma of the superior mediastinum with extension to the heart, pericardium, trachea, bronchi, and left upper lobe of 1 year's clinical duration.

In discussion, **Dr. C. P. Cake** noted that the incidence of primary carcinoma of the lung is increasing. Points in etiology are: Inflammation, trauma and inhalation of dust, particularly from tarred streets. Common symptoms are cough, hemoptysis, pain (probably the most constant and characteristic symptom), clubbing of the fingers and enlarged superficial veins resulting from partial or internal circulation. The diagnosis may be made by bronchoscopy or examination of the sputum containing carcinoma cells. Lantern slides showing the roentgenologic pictures in 12 patients were presented.

Dr. R. M. Choisser stated that he felt that an incidence of 5 to 10 per cent is too high. Only 3 or 4 cases of carcinoma of the lung in about 4,000 autopsies have occurred at Gallinger Municipal and George Washington University Hospitals. It is interesting that in one series of negroes studied in the tropics, 12 per cent showed some kind of cancer. Carcinoma of the lung may arise from glands in the peribronchial stroma. A case of Hodgkin's disease complicating carcinoma of the lung has been seen.

Dr. R. R. Jones stated that the part trauma plays in etiology is questionable. In over 2,000 cases of trauma of the thoracic cage carcinoma did not occur.

Colonel Pillsbury concluded by remarking that the cases presented in both scientific papers were from a series of Army men, many of whom were veterans of the World War and were in the right age group for carcinoma of the lung.

The first portion of the meeting adjourned at 3:10 P.M.

The second part of the meeting was held in the histology room. Twelve members were present. Dr. Harry A. Davis was elected to membership.

Presentation of Cases

Dr. L. M. Milstead gave the history of a girl of 26 years who had a tumor of the chest wall with pain for 2 months. A question of malignancy was raised.

Dr. Milstead also presented a case of a 35-year-old white man with albumen and red blood cells in the urine, pain radiating from the kidney to the scrotum and fever which were thought to be caused by kidney stones. On the next day he had a sudden pain with paralysis in the right leg. On the next day there was sudden pain with paralysis in the left leg with some of the abdominal reflexes absent; the feet became gangrenous; later the fingers of both hands became cold and the skin began to shrink. At the autopsy no embolus was found and there was much arteriosclerosis in the extremities. Glomerular nephritis was also present. In discussion, **Major R. O. Dart** thought that the tumor of the chest wall was probably malignant; **Dr. R. M. Choisser**, benign; **Dr. W. M. Yater**, chronic inflammation of the lymph node.

Dr. R. D. Lillie presented for **Dr. P. M. Ashburn** a case of suspected Hodgkin's disease, and also a case of diffuse parenchymatous goiter in a colored male, aged 39 years, who gave a history of progressive illness of 5 months' duration consisting of nervousness, insomnia, palpitation of the heart, exophthalmos and loss of weight. The basal metabolism was +68. In discussion, **Major R. O. Dart** felt that the lesion in the first case was probably inflammatory but that the patient should be watched. Hypertrophied vessels in the node are against Hodgkin's disease. **Dr. R. M. Choisser** considered Hodgkin's disease likely. Various aspects of Graves' disease were discussed by **Drs. Lillie, J. G. Pasternack, E. DeCoursey** and **W. M. Yater.**

Dr. R. M. Choisser presented a case of a 53-year-old white male who had a small tumor of the left submaxillary region since childhood. In the last year this tumor had grown. A biopsy indicated alveolar carcinoma. Dr. Choisser also presented the case of a 57-year-old white man who for 7 months had an ulcer near the anus. There was old, healed tuberculosis of both lungs. A slide stained by Ziehl-Neelsen technic showed abundance of acid-fast bacilli.

Dr. Choisser presented a third case of a 42-year-old white woman who had bilateral small tumors over the bifurcation of the parotid arteries for 10 years or longer. At operation no connection with the salivary glands was found. The consensus of opinion of the members present concerning the last case was mixed tumor.

The meeting adjourned at 4:35 P.M.

COMING MEETINGS

Wednesday, February 5: Business Meeting. Reports of committees.

Wednesday, February 12:

1. "Chronic Otitis Media." P. S. Constantinople, M.D.
2. "The Common Cold and Asthma." Harry S. Bernton, M.D.
3. "Acromegaly." Elizabeth Parker, M.D., and Harry Douglas, M.D.

Wednesday, February 19: The Staff of Mount Alto Hospital will present a Symposium on Cardiac Pain:

1. "Analysis of 200 Cases." E. A. Martin, M.D.
2. "Cardiac Pain, Without Organic Basis." J. Duerson Stout, M.D.
3. "Cardiac Pain, With Organic Basis." Louis Hamman, M.D.

Discussion to be opened by Lewis C. Ecker, M.D., and Antoine Schneider, M.D.

Wednesday, February 26:

1. "Epidemic Poliomyelitis in Washington. Clinical Survey with Emphasis on Diagnostic Features." Alfred L. Abrams, M.D.
   Discussion to be opened by Frank Leech, M.D.
2. "The Geography of Disease." Earl B. McKinley, M.D.

Friday, February 28: The Section on Internal Medicine.

1. "The Medical Aspects of Cataract." Ernest Sheppard, M.D.
2. "The Etiology of Rheumatoid (Atrophic) Arthritis." Walter K. Myers, M.D.

NEWS AND PERSONALS

Washington Gynecological Society

November 23, 1935:

1. "Pelvimetric Roentgenography." J. Bay Jacobs, M.D.
2. "Presentation of Specimen of an Unusual Fibroid Tumor." Major Raymond O. Dart, by invitation.
3. Case reports: "Sarcoma of the Ovary." Clayton H. Hixson, M.D.

January 25, 1936:

1. "A Study of the Asphyxia and Early Respirations of the New Born." Robert A. Wilson, M.D., Brooklyn, N. Y., by invitation.

Louis Mackall Medical Society

January 13, 1936:

1. "Arteriovenous Aneurism." Walter K. Angevine, M.D.
2. "The Medical-Dental Service Bureau." (Speaker to be appointed from the Bureau Staff.)

Georgetown University School of Medicine

Course in Medical Socio-Economics

A course of 10 lectures is to be given to the senior class of the Georgetown University School of Medicine within the next few months. Interested members of the Medical Society of the District of Columbia are invited to attend. A prospectus of lectures to be given, 10 to 11 A.M., is as follows:

February 12: "Introductory." Arthur C. Christie, M.D.

Definition of medical economics—a branch of medical sociology. The physician's traditional ideals; his obligations outside of his purely professional work; his obligations both as a physician and a citizen. His relations to the public, to the Public Health Department, to social service workers and organization. Relation of medical economics to medical ethics. History and organization of the American Medical Association.

February 19: "History of Medical Education." Wallace M. Yater, M.D.

Education of the physician. Where should the emphasis be placed in the undergraduate course? Internship—its opportunities and obligations; emphasis upon the training for general practice and upon study of pathology. When should study for specialization begin? Residencies, fellowships, etc. Post-graduate education. Organized medicine. Medical societies; medical conventions; medical journals. What should the doctor read?

February 26: "The Relation of the Physician to Other Physicians and to the Private Hospital." H. C. Macatee, M.D.

March 4: "Group Practice." J. Russell Verbrycke, Jr., M.D.

Relation of the doctor to free clinics and municipal hospitals. Practice under the Workmen's Compensation Act.

March 11: "The Doctor and the Public Health." George C. Ruhland, M.D.

March 18: "The Doctor's Office and Business Methods." Oscar B. Hunter, M.D.

Consultations. Office plans and equipment. Medical records. Collection of bills. Fee schedules. Vacations.

March 25: "Socialization of Medicine." Arthur C. Christie, M.D.

Definitions. History. Summary of European systems. Plans now being proposed for the United States.

April 1: "Voluntary Insurance Methods now in Operation in the United States." Arthur C. Christie, M.D.

Contract practice. Industrial medicine.

April 8: "Plans of the American Medical Profession to Meet the Problems of the Present Day." Mr. Ross Garrett.

Summary of plans of the American medical profession to combat state medicine and to assure medical care to all of the people at prices they can afford.

April 15: "To What Extent Has Socialization of Medicine Taken Place in the United States?" Arthur C. Christie, M.D.

Is its further extension necessary? Defects and evils of health insurance. Attitude of the American medical profession towards health insurance and state medicine.

George Washington University School of Medicine

Fourth Annual Postgraduate Clinic

On Saturday, February 29, 1936, at the George Washington University School of Medicine and

Hospital, 9 A.M. to 4 P.M., there will be laboratory demonstrations, clinics—medical and surgical, and formal papers. Arrangements have been made for a luncheon at the hospital at noon. A cordial invitation is extended to all alumni and the general profession to attend all scientific assemblies.

Committees

Arrangements: Drs. W. Warren Sager, *chairman;* Walter A. Bloedorn, Harry F. Dowling, Jacob Kotz, *secretary;* William J. Mallory and Arch L. Riddick.

Publicity: Drs. G. Louis Weller, Jr., *chairman;* William S. Anderson, E. Leonard Goodman, Herbert P. Ramsey, Frederick A. Reuter and James W. Watts.

Alumni Reunion and Tenth Annual Banquet George Washington University Medical Society

New Willard Hotel, 7:30 P.M., February 29

Alumni and members of the profession may obtain tickets for themselves and medical guests at the office of the Medical School. Dr. W. W. Herrick, Clinical Professor of Medicine, Columbia University, New York City, will be the guest speaker.

Banquet Committee: Drs. Cline N. Chipman, *chairman;* W. Raymond Thomas, W. Preston Haynes, Margaret M. Nicholson, Harry F. Dowling, Beveridge Miller, Raymond W. Murray, G. Louis Weller, Jr., John A. Reed, Frank L. Williman, A. C. Gray and David Davis.

Smith-Reed-Russell Lecture

Dr. Philip Bard of the Department of Physiology of Johns Hopkins University gave the lecture on Thursday, January 16, at 11 A.M. Subject: "The Neural Bases of Certain Forms of Emotional Expression."

American Board of Ophthalmology

Examination Announcements for 1936

May 11: Kansas City, Mo., in conjunction with the American Medical Association meeting.

October: New York City with the meeting of the American Academy.

All applications and case reports must be filed at least 60 days before date of examination. For further information, syllabuses and application forms please write at once to Dr. Thomas D. Allen, Assistant Secretary, 122 South Michigan Avenue, Chicago, Illinois.

ISAAC SCOTT STONE, M.D., Sc.D., LL.D.

1851–1935

CAT.

Isaac Scott Stone, M.D., Sc.D., LL.D. (1851–1935)

CAT.

Dr. Isaac Scott Stone, professor emeritus of gynecology, Georgetown University, Fellow of the Royal Society of Medicine, London, who died on December 22, 1935, was born in Sandy Spring, Md., March 1, 1851, the son of James H. and Martha A. Scott Stone. He became an active member of the Medical Society of the District of Columbia in 1892, a life member in 1932. Through his ability as a surgeon and his many contributions to the advancement of science he was nationally known. Thirty years were devoted to service on the Columbia Hospital Staff. His alma mater, University of Maryland, conferred on him the honorary degree of Sc.D. in 1907. In 1921, Georgetown University granted him the degree of LL.D. Dr. Stone served the Medical Society of the District of Columbia as vice president and on various committees, notably as chairman of the committee which compiled the service records of members in the late war. He was a founder of the

Southern Surgical and Gynecological Association, and the American College of Surgeons. Dr. Stone is survived by two daughters, the Misses Edna and Helen Stone, and a son, J. Austin Stone, of this city.

DISEASES OF THE NERVOUS SYSTEM

(*Continued from page 20*)

ward or dancing. There are constant jerky movements referable to all muscle groups of the extremities. Facial grimacing is almost a constant finding. The movements may be limited to one side of the body, and the condition is then known as hemichorea. The movements are usually accentuated by emotion or by observation. The deep reflexes are decreased, but the superficial reflexes are unaffected. The temperature is often raised, especially when the choreic syndrome is associated with tonsillitis, endocarditis or rheumatic fever. Changes in the cerebrospinal fluid are slight and inconstant.

Course and Prognosis. The course is generally self-limited, rarely lasting more than 6 months. Recurrences, however, are rather frequent. Death during the acute attack is very rare and is usually due to a coëxistent endocarditis.

(*To be continued*)

MEDICAL SOCIETIES WITH LIMITED MEMBERSHIP

WASHINGTON, D. C.

SOCIETY	PRESIDENT	SECRETARY	REGULAR MEETING
Baltimore-Washington Dermatological	D. C. Smith, Charlottesville	F. A. Ellis, Balto.	3d Thursday
Clinical Club	W. Warren Sager	Harry S. Bernton	1st Tuesday
Clinico-Pathological	William B. Marbury	Lee McCarthy	1st and 3d Tuesdays
George Washington University	J. C. Bradley	Harry F. Dowling	3d Saturday
Georgetown Clinical	Elmer Shepherd	Harry F. Davies	3d Tuesday
Hippocrates-Galen	Harry F. Anderson	John F. Preston	1st Thursday
International Medical Club	William Earl Clark	P. S. Constantinople	On Call
Jacobi	George Nordlinger	Samuel A. Machlis	3d Monday
Kober	Ernest E. Hadley	Howard L. Smith	3d Monday
Mackall	Howard H. Strine, Jr.	R. Lomax Wells	2d Monday
Medical Arts	Alec A. Preece	R. Massie Page	2d Thursday
Medical Review Club	F. J. Eichenlaub	Robert M. Bolton	4th Friday
Osler	Fred R. Sanderson	E. Kirby Smith	3d Monday
Pan American (D. C. Branch)	Henri de Bayle	A. A. Moll	On Call
Virginia, Maryland and District of Columbia	W. C. Welburn, Clarendon	A. M. MacDonald	Semiannually
Washington Academy of Surgery	Charles S. White	W. Warren Sager	2d Friday, Bimonthly
Washington-Baltimore Psychoanalytic	Lewis B. Hill, Balto.	Amanda L. Stoughton	2d Saturday
Washington Gynecological	E. W. Titus	Herbert P. Ramsey	4th Saturday*
Washington Heart†	Lewis C. Ecker	James W. Esler	Monthly; On Call
Washington Medical and Surgical	Tomas Cajigas	Joseph Horgan	4th Monday
Washington Ophthalmological	James N. Greear, Jr.	Ernest Sheppard	1st Monday, Bimonthly
Washington Society of Nervous and Mental Diseases	Samuel A. Silk	Wm. G. Cushard	3d Thursday
Washington Society of Pathologists	Wallace M. Yater	E. De Coursey	1st Saturday
Washington Urological	Adam Kemble	Ivy A. Pelzman	3d Monday
Women's Medical	Elizabeth Kittredge	Alma Jane Speer	1st Tuesday

* October, November, January, March and May.

† Permanent office with lay secretary, Mrs. Wade Martin, 1315 Nineteenth Street, N. W.

MEDICAL ANNALS
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THE HEART AS A SURGICAL ORGAN*†

CLAUDE S. BECK, M.D.
Cleveland, Ohio

It is a unique event for a surgeon to discuss the heart. Every other organ in the body has maladies some of which are treated by internists and others by surgeons. The maladies of the heart, however, are almost entirely the concern of the internist and practically none concern the surgeon. Because of this unusual situation I hope that I may succeed in presenting the surgical point of view concerning certain disorders of the heart. I am sure the internist will call in the surgeon for any cardiac conditions that he is able to treat.

The surgeon has kept away from the heart for several good reasons. In the first place, the heart is always in motion, and a new set of surgical reflexes is necessary to permit one to operate upon the heart. Every other organ in the body stands still for the surgeon while he operates. Even the pituitary gland, difficult as its exposure may be, stands still at operation. In the second place, the heart has a frightful capacity for hemorrhage. It is the only muscular structure in the body that carries blood under high pressure. The myocardium is tense from the pressure within. It is friable and easily torn. Any surgical manipulation on the wall of the heart may lead to rupture and hemorrhage. Thirdly, the heart is a sensitive organ. Every time its surface is touched it responds by an extrasystole; if these extrasystoles are repeated frequently the myocardium may fibrillate, and from this there is no recovery.

I do not know why, but I suppose it was for reasons similar to these that Billroth, the great pioneer in gastric surgery, was prompted to say that a heart operation was a prostitution of surgical skill. At any rate, very little attention was given to the heart during the great age of surgical pioneering, 1887–1910. The first quarter of the twentieth century went by and the heart did not receive serious study by any surgeon either in America or abroad. What was done was of a sporadic nature. I began my first experiments on the heart in 1923. My point of view at that time was similar perhaps to the point of view entertained by many in the audience this evening, namely, that there were no surgical problems concerning the heart that needed elucidation. I felt that the surgeon working on the heart was 'working in a blind alley.' For a long time I really was 'working in a blind alley.' The yield for the efforts during the first years was very little. As the years went by an experience accumulated and certain problems in cardiopericardial surgery began to take on a clear and distinct form. After this point was reached the solution of these problems became a matter of observation and experiment. The number of experimental operations on the heart done by my associates and myself in the last 12 years is well over 1,200, perhaps 1,800.

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* Read at a joint meeting of the Washington Heart Association and the Medical Society of the District of Columbia, November 20, 1935.

† From the Department of Surgery, the Western Reserve University School of Medicine and the University Hospitals.

Out of this experience came a good many developments which are entirely new. Some of these, I believe, are of great importance. The heart is at the threshold of a very nice development in surgery. Indeed, the time is not far off when operations upon the heart will be almost as common as operations upon the vermiform appendix.

I am going to present 3 subjects for discussion: (1) Trauma to the heart; (2) compression of the heart; and (3) the development of a new blood supply to the heart by operation.

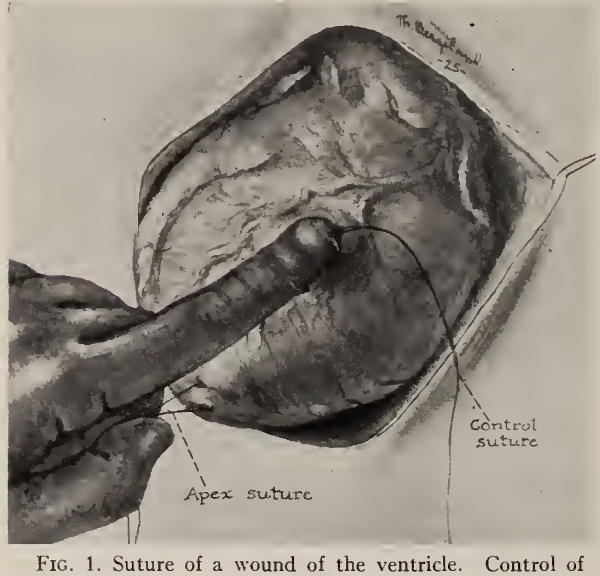

Fig. 1. Suture of a wound of the ventricle. Control of hemorrhage from wound preparatory to suture; traction on apex suture steadies heart so that index finger can be maintained effectively on wound; a control suture is being placed.

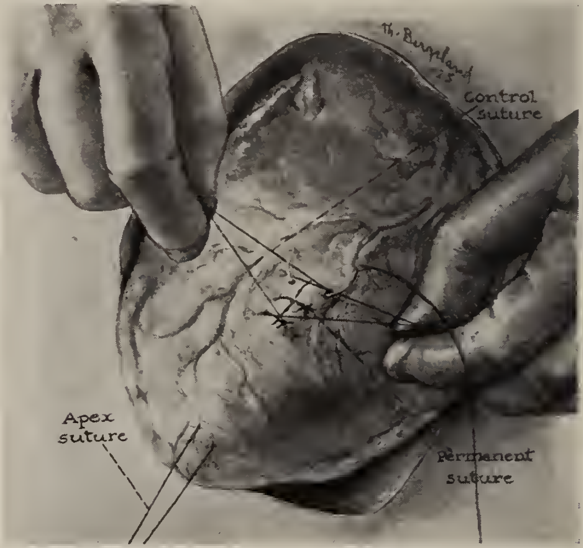

Fig. 2. The control sutures are crossed and held under gentle traction by the assistant; hemorrhage can thereby be controlled, and a good exposure of the wound is provided. The permanent sutures can be placed so that adjacent coronary vessels are avoided and a satisfactory approximation of the wound is obtained.

CARDIAC TRAUMA

When one mentions cardiac trauma he thinks usually only of the penetrating wound—the stab or gunshot wound of the heart. Concerning the penetrating wound I shall only present a method by which such wounds can be successfully sutured. This method is illustrated in Figures 1 and 2. Under no circumstances should a finger be placed into a cardiac wound, because the myocardium tears and the wound is made larger. A suture in the apex is essential in handling the organ. If an auricular wound is present the technic is entirely different. If a finger is placed on an auricular wound, the bleeding will not stop. The bleeding auricle retracts beneath the finger. The margin of an auricular wound should be grasped in clamps and then sutured. The margin of a ventricular wound should never be grasped in clamps, because the ventricle crumbles in the clamp.

I should like to direct your attention to another type of cardiac wound, a type that has been almost completely overlooked, namely, the non-penetrating wound. I have adequate reasons to believe that contusions of the heart are more common than stab or bullet wounds of the heart. This lesion has been almost entirely overlooked insofar as recognition during life is concerned and entirely neglected insofar as surgical treatment is concerned. It is difficult to understand why the profession has given to the heart an immunity to contusion because the heart occupies practically all of the space between the sternum anteriorly and the vertebrae posteriorly. Any force applied to the chest may reduce this space, and any decrease in the anteroposterior diameter of the chest directly affects the heart. The most common type of injury producing cardiac contusion is what I have called the "steering-wheel type" of accident (Fig. 3). In this age of automobiles this type of accident is entitled to a classical place in traumatic surgery. It should be looked for in every injury of the chest and especially in the "steering-wheel type" of injury.

Accurate diagnosis is often difficult, sometimes impossible. Experimentally the heart rate increases after a contusion, but it can become slower after injury. The arterial pressure momentarily falls but usually returns promptly to the normal level. The heart sounds may be of reduced intensity. A pericardial effusion may or may not develop after the injury. Cardiac pain, anginal in type, may be present. The electrocardiogram may show alterations from the normal, similar to the alterations produced by a myocardial infarct. Auricular fibrillation may develop. This may be transitory or permanent. Healing takes place by fibrosis, and the pericardium becomes adherent to the area of contusion in the heart. This adhesion is silent insofar as diagnosis is concerned. Recovery is the rule after a cardiac contusion, but diagnosis usually is not made if the patient recovers. Only a few cases have been recognized clinically, and almost all of the cases in the literature were recognized only at necropsy. The patient may recover without signs or symptoms of any cardiac difficulty, or he may recover and show signs of failure, precordial pain, auricular fibrillation, or cardiac asthma. An aneurism of the heart may develop. Death may occur from rupture of the heart or from tachycardia and failure. The minimal evidences upon which a diagnosis of cardiac contusion can be made are: (1) Absence of evidence of a cardiac abnormality prior to the accident; (2) the history of an accident involving the precordium; and (3) weakness immediately following the accident.

The treatment consists of rest until a supporting scar forms at the area of contusion. Any rise in the intracardiac pressure may produce a rupture of the heart. In the 157 cases analyzed by Bright and myself we found that some chance for operative intervention existed in about 25 per cent of the cases. Not a single case of cardiac rupture has been operated upon. The operation consists of suture of the wound if possible. We have shown experimentally that the heart can be strengthened or reinforced by a graft of fascia lata or pericardium placed over the contusion. This operation has never been done on a human being. In the future it may be applicable also in reinforcing an infarcted area due to coronary thrombosis. Development along this line undoubtedly will take place.

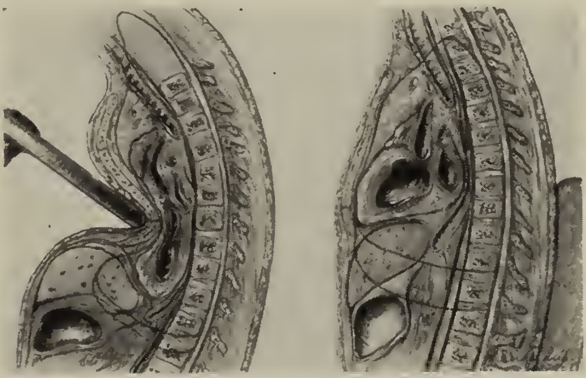

Fig. 3. The heart is compressed between the vertebrae posteriorly and the sternum anteriorly. This form of accident is not uncommon and may be referred to as the "steering-wheel injury."

Cardiac Compression

Compression of the heart is the diametrical opposite of dilatation of the heart. We are all acquainted with the dilated heart; few of us are acquainted with the compressed heart. The dilated heart is a medical disorder. The compressed heart is a surgical disorder. Operation can save life. It is frequently urgent. The results of operation are among the triumphs of modern surgery.

Compression of the heart may be acute or chronic. Acute cardiac compression produces (1) a falling arterial pressure, (2) a rising venous pressure, and (3) a small, quiet heart. This triad of symptoms is diagnostic of the acutely compressed heart (Fig. 4). Experimentally a compression force of 14 to 16 cm. of water applied to the heart is fatal. This measurement for man has never been determined, but I believe the pressure producing death would be about the same for man. The lesions producing acute cardiac compression are usually collections of fluid in the pericardial cavity. The fluid may be blood, pus or a sterile transudate. Blood may come from a stab wound of the heart, from the aorta, pulmonary artery, venae cavae, internal mammary vessels, etc. It may come from spontaneous rupture of the heart or from rupture associated with a myocardial infarct. It may occur in diseases of a hemorrhagic diathesis. Acute compression of the heart can develop from pressure of a gas. The gas may be air sucked in through a penetrating wound or from a wound of the lung. It is associated with valvular pneumothorax. The gas may arise from infections of a gas-producing nature.

Chronic cardiac compression produces (1) a high venous pressure, (2) ascites, and (3) a small, quiet heart. This triad of symptoms is diagnostic of the chronically compressed heart (Fig. 5). The highest venous pressure that I have found was 42 cm. of physiological solution of sodium chloride. These highest pressures occur in patients in whom the heart is compressed in scar tissue. Measurements of the compression-force exerted directly upon the heart cannot be taken in such cases because of the scar. I have had cases in which the compression was due to fluid, and direct pressures upon the heart of 20 to 30 cm. have been obtained. I want to emphasize this point, that the pressure in the great venous gateway to the heart (intrapericardial segments of the venae cavae and the right auricle) must always be higher than the pressure outside these structures. In other words, a positive pressure-differential is always necessary between the pressure in the venae cavae and the pressure upon the heart. If the heart is compressed by a force of 30 cm., the pressure in the venous system must be 30-plus cm. If the pressure in the venous system is 42 cm., the compression upon the heart must be 42-minus cm. This is an enormous pressure upon the heart, and such pressures are scarcely compatible with life. It is interesting to recall that in the acute condition 14 to 16 cm. is fatal, whereas in the chronic condition a much higher pressure can be tolerated.

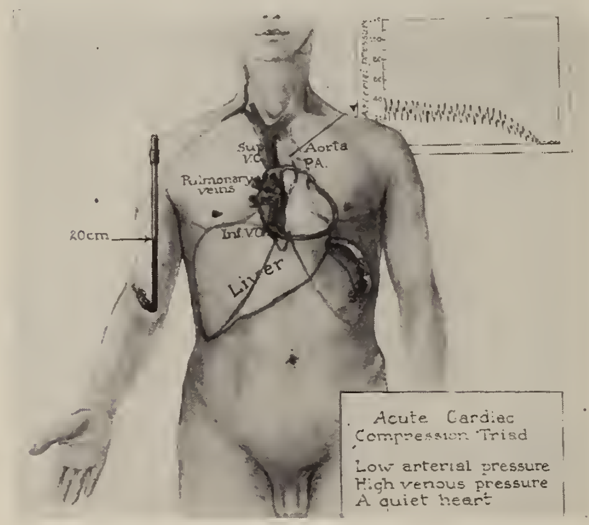

FIG. 4. ACUTE CARDIAC COMPRESSION TRIAD

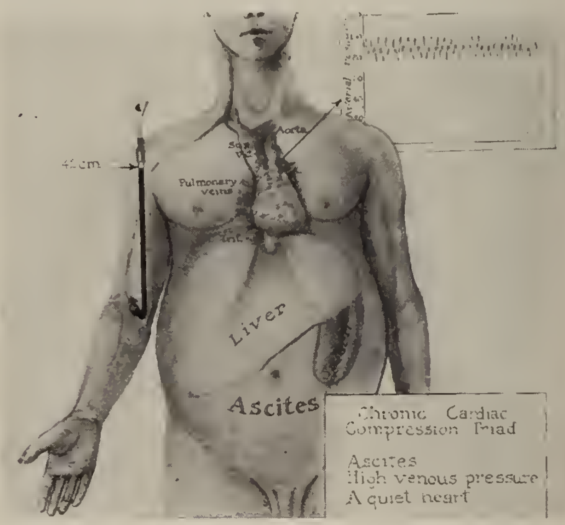

FIG. 5. CHRONIC CARDIAC COMPRESSION TRIAD

Various other clinical manifestations of chronic cardiac compression are present. The high venous pressure stretches the walls of the veins so that they become prominent. The liver also undergoes enlargement, and serum filters through the capillary walls producing subcutaneous edema. Because of the slowly moving circulation cyanosis and dyspnea are also present. On the arterial side of the circulation we find a low pulse pressure, a low systolic pressure and pulsus paradoxus. The electrocardiogram shows low voltage and slurring. The nutritional state is below normal. The heart is always small. A compressed heart cannot dilate nor can it hypertrophy. In some cases a glance at the precordium tells one whether or not the heart is compressed. If precordial pulsation is present, the heart is not compressed. This observation can save the surgeon the embarrassment of operating upon a dilated heart with ascites and failure. The heart sounds in the compressed heart are faint and distant. There are no murmurs. The systolic-diastolic excursion of the heart is reduced. This can be determined by fluoroscopic examination. The size of the cardiopericardial shadow varies with the lesion producing the compression. If the compression is due to fluid this shadow is large; if it is due to scar tissue around the heart, the shadow is small. A neoplasm or an abscess may produce a unilateral shadow.

Treatment of cardiac compression is always surgical. These forms of circulatory failure are mechanical. They should, and do, yield to mechanical methods of treatment, namely, operative. Fluid can be removed by aspiration in some cases, but in other cases pericardiotomy must be done. Hemorrhage must be controlled by suture. Pus must be removed by open drainage, provided it is not tuberculous. Tuberculous pus should be removed by aspiration. Scar tissue is removed by delicate dissection from the heart. Neoplasms sometimes can be removed.

The Development of a New Blood Supply to the Heart by Operation

It is a perversity of nature that the most important muscular structure in the body is the most defenseless. The appalling incidence of sudden death in our adult population from "heart attacks" attests to the destructive nature of coronary arterial disease. The heart is anchored in the body by the great vessels at the base. It has a minimal amount of direct continuity with the body. Because of this anatomical pattern the heart has been deprived to a great extent of its ability to develop a collateral blood supply.

To attempt to give the heart a new blood supply by grafting tissues onto the myocardium was an entirely new venture in surgery. The mesothelial envelope around the heart was destroyed by roughening the lining of the parietal pericardium and also the epicardium by means of a burr. A new vascular bed was constructed by bringing various grafts onto the myocardium. The tissues that were used for the new vascular bed were fibrous pericardium, pericardial fat, pedicle grafts of skeletal muscle from the chest wall, and omentum brought up through an opening in the diaphragm. Anastomoses between the grafts and heart could be demonstrated in 3 weeks after the grafts were placed. Anastomoses increased after a physiological need for blood was established in the myocardium. The physiological need for blood is perhaps more accurately defined as a pressure-differential between the two vascular beds. It was produced by occlusion, partial or complete, of major coronary arteries.

Anastomoses were demonstrated in two ways. They were demonstrated by injection of dye into the myocardium by way of the grafts. This was done by excluding every portal of entry into the heart except the extracardiac anastomoses. The aorta was clamped. It was cut between clamp and heart so that injection through coronary arteries and thebesian vessels was impossible. Dye was then injected into the aorta. A profuse and deep staining of the myocardium was obtained in specimens in which a physiological need for blood existed. A capillary injection of myocardium was obtained.

Anastomoses were also demonstrated by injecting a solution of barium sulphate into a coronary artery and tracing the solution in the chest wall by means of X-rays. The solution of barium sulphate had the consistency of thick cream. It was too thick to enter capillaries. The experiment was carried out as follows: The heart was given a collateral vascular bed, and a physiological need for blood was produced by occlusion of the right coronary artery. Several months later the left coronary artery was injected. X-ray showed the opaque mass in both right and left coronary arteries. From the heart it spread to the chest wall and filled internal mammary, many intercostal, diaphragmatic and epigastric arteries.

In some of the experiments the heart was given a collateral vascular bed, and at the same operation partial occlusion of one of the coronary arteries was produced by means of a silver band. Several weeks later this artery was completely occluded. The right coronary artery or either major branch of the left coronary artery could be occluded, with recovery following regularly without infarction if the occlusion was done in two stages.

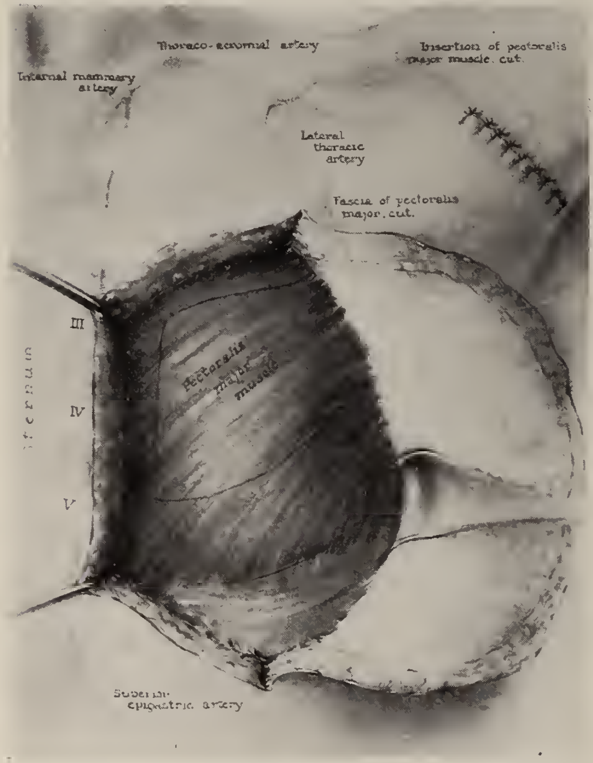
Thoraco-acromial artery
Insertion of pectoralis major muscle, cut.
Internal mammary artery
Lateral thoracic artery
Fascia of pectoralis major, cut.
III
IV
V
ternum
Pectoralis major muscle
Superior epigastric artery

Fig. 6. The insertion of the pectoralis major muscle was incised. A flap of skin and pectoral fascia was turned laterally. The pectoral muscle was incised as shown. This provided a pedicle graft of muscle with its attachment lateral to the sternum.

In another series of the experiments the heart was given a collateral vascular bed, and then occlusion of the coronary arteries was carried out in 4 or 5 subsequent operations. It was possible to occlude completely the right and both major branches of the left coronary arteries. The entire coronary supply was cut off except for the septal branch which comes off above the bifurcation of the left. This was accomplished with recovery and without infarction.

In other experiments the heart was given a collateral vascular bed, and several weeks later the right coronary artery was ligated completely in one stage. There were 4 deaths and 8 recoveries. The right coronary artery was ligated in normal dogs for controls; in these control experiments there were 7 deaths and 3 recoveries. It appears that the vascular grafts protect the heart against sudden complete occlusion of the right coronory artery. In this respect the grafting is prophylactic. A similar statement can be made concerning ligation of the ramus descendens of the left coronary artery.

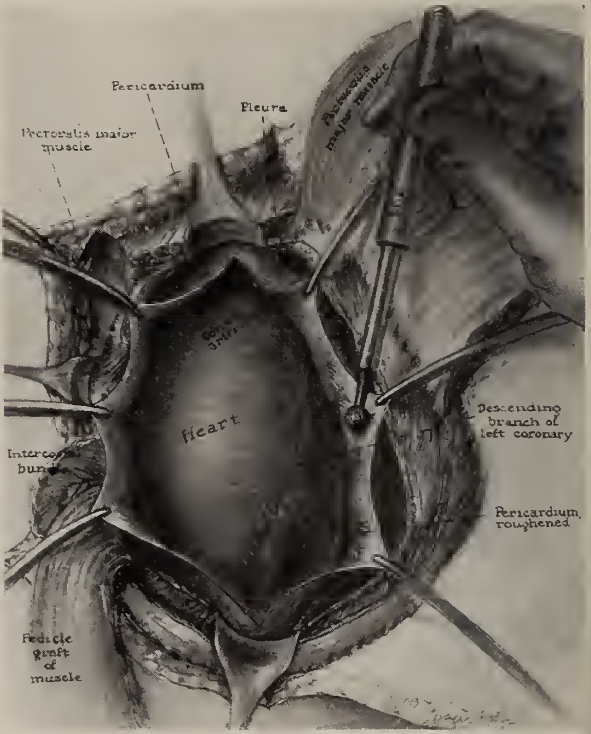
Pericardium
Pleura
Pectoralis major muscle
Pectoralis major muscle
Heart
Descending branch of left coronary
Interco
bun
Pericardium, roughened
Pedicle graft of muscle

Fig. 7. The pericardium was opened. The inner surface of the pericardium was roughened with a burr.

Two types of experiment are presented for comparison: (A) Complete ligation in one stage of 4 or 5 peripheral branches of the coronary arteries over the apex of the left ventricle was always fatal; ventricular fibrillation developed. (B) The right and both major branches of the left coronary arteries could be occluded by about one third of their cross-section in one stage with recovery. The total amount of blood going through the coronary system in A can be assumed to be greater than in B; yet A was a fatal experiment and B resulted in recovery. These experiments bring out an entirely new point insofar as the heart is concerned, namely, the importance of an equal distribution of blood to the myocardium. Total coronary blood flow is one factor that concerns the preservation of the heart beat, but distribution of blood flow is another important factor.

The collateral vascular bed can function in effecting an equal distribution of blood to various parts of the myocardium. This is effected in 2 ways: First, by bringing blood from extracardiac sources into the myocardium; and second, by transporting blood from one part of the heart where the circulation is good to another part of the heart where the circulation is deficient. In the latter respect the grafts act as anastomotic bridges connecting the beds of different vessels.

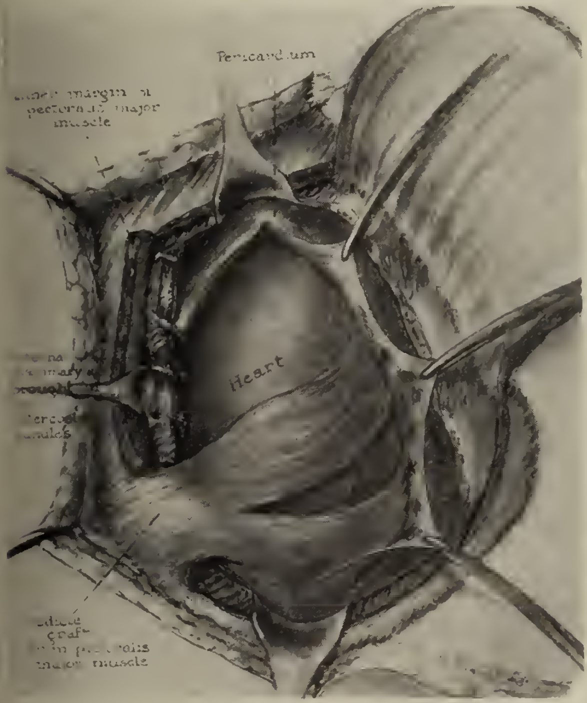

FIG. 8. The pedicle grafts were carried posteriorly to the circumflex bed and sutured to the parietal pericardium. The intercostal bundles were carried beneath the sternum and sutured to the parietal pericardium. This carried the internal mammary vessels onto the surface of the heart.

The grafted tissues do not interfere with the movements of the heart. Cardiac adhesions are usually silent and incidental lesions.

On the basis of this experimental data we felt that we could give the heart a new blood supply. If this could be done on the dog's heart, why could it not be done on the human heart? The human heart struggling along with arteries that are becoming occluded is comparable in a great many cases to the experimental heart with arteries occluded by silver bands.

The author's operation was carried out on a patient with coronary sclerosis for the first time on February 13, 1935. This patient was a laborer of 48 years. He had had angina of effort for 5 years and was totally incapacitated before operation. He was willing to accept death rather than endure life with its pain and incapacity. The operation consisted of grafting the left pectoral muscle, fibrous pericardium, pericardial fat and left internal mammary artery upon the heart. The insertion of the pectoral muscle was cut to mobilize the muscle. This muscle was incised to the left of the sternum. Several costal cartilages on the left were removed. The pericardium was incised. The epicardium and parietal pericardium were roughened by means of a special burr. A pedicle graft

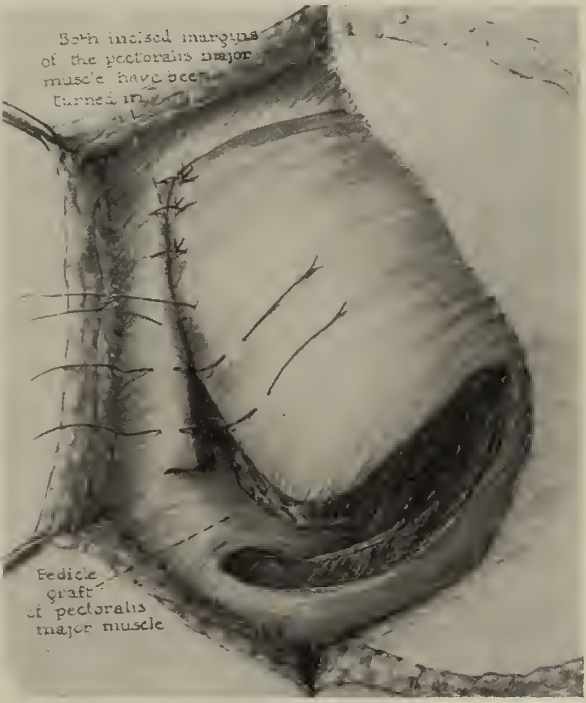
Both incised margins of the pectoralis major muscle have been turned in
Pedicle graft of pectoralis major muscle

FIG. 9. The parietal pericardium was left open and the incised margins of the pectoral muscles were inverted so that they came into contact with the heart.

of pectoral muscle was swung to the posterior aspect of the left ventricle. The incised margins of the pectoral muscle were inverted so that they came into contact with the heart (Figs. 6, 7, 8 and 9). The patient made an excellent recovery. Nine months after operation he is completely free from pain. He is employed as a gardener and a janitor.

A total of 8 patients have been operated upon. These patients were selected by Dr. Harold Feil. Dr. Feil is collaborating with me in the clinical aspect of this work. Each of these patients had advanced coronary sclerosis. Four survived and 4 died. Our second patient died about 1 week after operation with thrombosis of the left common iliac artery. The third patient has what I consider an excellent result. He had had a total thyroidectomy about a year before the cardiac anastomosis was done. He went through the cardiac anastomosis and began to improve. His angina pectoris has practically disappeared. He gets what he calls a little tightening sensation but no pain. He takes no drugs for the pain. His dose of thyroid extract has been trebled without pain. His activities have increased. The fourth patient continues to have a rapid pulse rate, continues to have anginal pain and has been helped only slightly. He had what may have been a myocardial infarct a year before operation, and we do not know how much permanent damage was sustained by the myocardium. The sixth patient has what I consider an excellent result. He feels well enough to return to work. The seventh patient died from thrombosis of the middle cerebral artery. The eighth patient died the morning after operation from coronary thrombosis.

In conclusion, I should like to say that this operation is a new attack upon a serious disease. What we have done is simply the beginning of a new development in surgery. The operation for coronary thrombosis must be worked out slowly and carefully. It is not developed far enough to be acceptable by the profession, and I would like to have more time before I attempt to make a definite appraisal of its value.

Author's Published Articles on the Subject of the Paper

Beck, C. S.: Wounds of the Heart; the Technic of Suture. Arch. Surg., 1926, **13**, 205.

Beck, C. S.: Contusions of the Heart. J. A. M. A., 1935, **104**, 109.

Beck, C. S.: Two Cardiac Compression Triads. J. A. M. A., 1935, **104**, 714.

Beck, C. S.: The Development of a New Blood Supply to the Heart by Operation. Ann. Surg., 1935, 102, 801.

Beck, C. S., and Cushing, E. H.: Circulatory Stasis of Intrapericardial Origin; the Clinical and Surgical Aspects of the Pick Syndrome. J. A. M. A., 1934, **102**, 1,543.

Beck, C. S., and Tichy, V. L.: The Production of a Collateral Circulation to the Heart. I. An Experimental Study. Am. Heart J., 1935, **10**, 849.

Beck, C. S., Tichy, V. L., and Moritz, A. R.: Production of a Collateral Circulation to the Heart. Proc. Soc. Exper. Biol. & Med., 1935, **32**, 759.

Bright, E. F., and Beck, C. S.: Nonpenetrating Wounds of the Heart; a Clinical and Experimental Study. Am. Heart J., 1935, **10**, 293.

Moritz, A. R., and Beck, C. S.: The Production of a Collateral Circulation to the Heart. II. Pathological-anatomical Study. Am. Heart J., 1935, **10**, 874.

UNKNOWN FACTORS IN THE ETIOLOGY OF INFECTIONS

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The great majority of bacterial diseases must be caused by minute doses of organisms, frequently in attenuated form, although after cultivation under favorable conditions a comparable number fail to produce lesions in most cases.

Pyogenic cocci are found rarely outside of infections (Welch) and should lose toxicity rapidly in dirt from the effect of drying, while streptococci are easily killed by desiccation and their pathogenicity diminishes rapidly on the best media. Both M. aureus and Streptococcus hemolyticus must be inoculated in relatively vast numbers to injure animals, yet when so few that their isolation is difficult, they cause infection after exposure to an environment that lessens their toxicity and kills streptococci.

Lobar pneumonia is considered to be directly contagious largely because pneumococci die very quickly in finely divided sputum outside the body (Wood), and the type that usually is present in the mouth is not the one commonly found in disease, indicating that auto-infection is rare. Contact with carriers or patients appears to be the only method for transmission of the infection, but physicians very seldom can trace one case to another, since people in close contact rarely catch it, except in epidemics.

Influenza, also, is contagious in spite of the failure of Rosenau, McCoy and others to transmit the disease in a thorough series of experiments, either by spraying the secretions of patients into the throats of volunteers, by directly transferring the secretions, or by close contact.

Again, the very existence of B. typhosus in water from the tap is an inference, and only in a few cases is there proof of its presence in city water supplies. The organism dies in natural waters in a few weeks, and its isolation from water is so rare that B. coli is taken as an index of pollution. However, unfiltered reservoir water was a common cause of typhoid fever and must have produced this disease by infecting man with organisms that were too few in number to be isolated, and these few in a dying state. In addition, B. typhosus should be greatly weakened by the normal acidity of the stomach.

Therefore, it seems necessary to conceive of the existence of some unknown factor to explain the necessity of sterility in surgery and the undoubted danger from unfiltered reservoir water, as well as the other discrepancies. The problem is an old one. Twort was trying to find a virus that influenced the behavior of bacteria when he discovered the phage which he mistook for a virus at first, but this lytic substance does not explain the inconsistencies that exist in the etiology of infections. On the other hand, if pathogenic bacteria were associated with viruses which increased their toxicity, these activating agents might be weakened or eliminated by passage through man and, therefore, minimal doses, even of attenuated organisms, could cause disease and still have little pathogenic power after isolation.

It is true that no principle of this type has been discovered by filtration experiments. But this failure is unconvincing, as, obviously, such an agent could not be recovered if it grew only in symbiosis with an organism or were so firmly united to the bacterium that it would be held back when filtered. Also, the organism might overgrow the agent and eliminate it, as B. pyocyaneus does pyogenic cocci in a wound.

The presence of such a virus in nature would make clearer the necessity of sterility in surgery and the danger of typhoid fever from water, and in pneumonia the virulence of the pneumococci that are normal to the mouth would be increased and their serological characters changed by the resulting reaction with the body. The disease would not be contagious, however, if the virus were neutralized by union with the pneumococci, unless the organisms were stimulated to such an extent in epidemics that direct transfer from person to person could infect without aid from the virus.

In a similar way, the failure of Rosenau and McCoy to transmit influenza may be explained. The virus stimulates the Pfeiffer bacillus which, in turn, destroys or greatly weakens the activating agent, without whose aid the secretions lose their infectivity by the time symptoms develop. Indeed, since Zinsser and Bayne-Jones suggest that Rosenau's failure was due to the lack of contagiousness of influenza when the symptoms are definite enough for diagnosis, and both a virus and the bacillus of Pfeiffer are incriminated in the disease, the supposition that it may be caused by an organism which is rendered virulent by a virus has even some probability.

The need of additional factors in the etiology of some infections appears obvious, and any evidence of a living agent which influenced the growth of bacteria would be significant. It, therefore, seems worth while to record some findings that were observed in studying the effect of drying on spore-bearers, although repetition of the experiments may be difficult if the results were due to a contamination.

The vegetative form of one variety that liquefied serum was dried on filter paper in the incubator for 48 hours, and then the filter paper was transferred to solid serum, upon which no growth occurred. The apparently sterile tube was re-inoculated with an attenuated strain of an undescribed spore-bearer that had the property of forming polar bodies, resembling those of B. diphtheriae, and this culture was found to be more luxuriant than usual and contained a greatly increased number of polar bodies.

The experiment was repeated many times with controls, and transfers from the filter paper were made in series for over 20 generations, on the supposition that a living principle was present, possibly a virus. These transfers continued to have a stimulant action on the growth and polar-body production of the attenuated organism, and this action was increased by keeping the active principle at 5°C. before use. A white coccus, growing faintly on solid serum when freshly isolated from saliva, possibly M. albus, and an attenuated culture of B. diphtheriae were stimulated in the same way.

The diphtheria bacillus was found to be killed by drying much more easily than was to be expected from statements found in textbooks, and a similar or identical stimulant principle was extracted by this means. It was cultivated for several generations and also was activated by residence in the refrigerator, a finding that would have a bearing upon the seasonal incidence of diphtheria in fall and winter.

The agent which was recovered from the spore-bearer was obtained after the spores had been subjected to 100°C. for 30 minutes. It follows either that it must resemble spores in structure, be produced from the spore-bearer by drying, or be a contamination that crept in from the air. Indeed, contamination from this source may be impossible to guard against, since a virus, too small to be seen with the microscope, might be able to pass through a cotton plug, and in this event the principle extracted from B. diphtheriae might have been the same contaminant.

If the agent was present in the air, it may have come originally from the polar-body forming spore-bearer, as this bacterium tended to revert to a common type without polar bodies and produced them in greater numbers when grown with the principle. A great deal of work on the organism had been done with the windows open and the dust of the laboratory probably contained many of its spores.

The experiments were run with controls which were made by inoculating sterile distilled water with attenuated strains in sufficient quantity to form a very faint turbidity. This emulsion was transferred to solid serum with a loop and the preparation compared with a similar transfer to the same medium, containing a 16- to 24-hour culture of the agent, activated by several days' residence in the refrigerator. The difference in growth in the 2 tubes was so marked that it could be observed in smears, just as the faint growth of Streptococcus hemolyticus may be told from a luxuriant culture of M. aureus by the amount of organisms transferred to a slide with a loop. Polar bodies in the spore-bearer and in B. diphtheriae, also, were markedly increased and more distinct when stained by Neisser's method.

The principle became very weak in 48 hours at 37°C., but was active again when transferred. It could be kept for a long time at 5°C. and was maintained best by placing in the refrigerator for at least a day between transfers of 16-hour growths. Little or no stimulation was noted when organism and principle were inoculated together, nor in cultures which grew heavily on serum, nor in subcultures from stimulated preparations, but the results were so striking when attenuated strains were added to the agent that smears could be read by the intensity of the blue of Neisser's stain, as well as by the microscope. To me, it seemed that some virus which stimulated growth of certain bacteria and was capable of independent reproduction had been recovered from the spore-bearer and from B. diphtheriae or had existed in the air of the laboratory.

NOTE. The tests were run at the Springfield State Hospital, Sykesville, Maryland.

BIBLIOGRAPHY

McCoy, G. W., and Richey, DeW. G.: Experiments Upon Volunteers to Determine the Cause and Mode of Spread of Influenza. Bull. Hyg. Lab., U. S. P. H. S., 1921, 123, Part 2.

Rosenau, M. J.: Experiments to Determine the Mode of Spread of Influenza. J. A. M. A., 1919, **73**, 311.

Welch, W. H.: Conditions Underlying the Infection of Wounds. Trans. Cong. Amer. Phys. & Surg., 1891, **2**, 1; also, Am. J. M. Sc., 1891, **102**, 439.

Wood, F. C.: The Viability of the Pneumococcus After Drying. A Study of One of the Factors in Pneumonic Infection. J. Exper. Med., 1905, **7**, 592.

Zinsser, H., and Bayne-Jones, S.: A Textbook of Bacteriology, with a Section on Pathogenic Protozoa. New York, Appleton-Century, 1934, p. 397.

THE PRESENT CONCEPTION OF SO-CALLED "CHRONIC CYSTIC MASTITIS"*

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This is a brief review of the present conception of a disease of the breast known formerly as chronic cystic mastitis, a term which recent investigators of the subject consider misleading and erroneous.

We are all acquainted with the female patient who comes in complaining of premenstrual fullness or painful swelling of either or both breasts. Associated with these symptoms may be menstrual disturbances and menstrual headaches. Occasionally there is also postmenstrual soreness. On examination such breasts may be found to be enlarged and nodular to the feel—the so-called "lumpy" or "shotty" breast. Occasionally even a single tumor with cystic feel may be made out, or a number of small hard nodules may be felt. Histologically these breasts are characterized by a proliferation of the alveolar and ductal epithelium, and by lymphocytic infiltration of the interacinar connective tissue. Often there are cysts of varying sizes found which may be lined by flat or papilliferous epithelium. Koenig, in 1880, termed this type of breast chronic cystic mastitis, believing it was inflammatory in character. It has also been known as Reclus' disease and Schimmelbusch's disease.

The disease has always been a subject of controversy and the two main points of contention were whether it is an inflammatory or neoplastic disease, and whether it is a benign condition to be treated conservatively or a precancerous disease to be treated radically.

The newer knowledge of breast physiology has helped to clear up the first controversial point. And this new concept has come about because the breast has been studied from the viewpoint that it is not a resting organ but an organ having sex rhythm similar to the uterus and, therefore, presenting different histologic pictures at different stages of the sex cycle. Another helpful aid has been the recent progress in the studies of the sex hormones. The breast develops at prepuberty and puberty because of stimulation by the hormone from the interstitial cells of the ovary. The breast attains full development and complete functional activity in pregnancy. The main factor in this development is the hormone from the corpus luteum which stimulates the epithelium of the breast acini and ducts. The corpus luteum in turn is under the influence of the hormone from the anterior pituitary gland. Concomitant with the menstrual cycle the breast undergoes regular progressive and retrogressive changes. Under the influence of the corpus luteum secretion there is a rapid increase in the epithelial elements with production of outgrowths from the ducts with the formation of new acini. Secretion appears in the lumina of the acini. In the postmenstrual phase there is a regression with disappearance of the small lobules, the periacinar connective tissue shows a lymphocytic infiltration, and the acini are filled with desquamating cells undergoing autolysis. These lymphocytes in the periacinar connective tissue gave rise to the idea that this was an inflammatory reaction, but the lymphocytes are functional cells containing a lipase and aid in autolysis. The uterus shows failure of pregnancy by casting off its decidua in the menstrual flow, but the breast cannot get rid of its secretion and its desquamated epithelial cells except through absorption, either because the coagulation of the secretion or the keratinized cells or the hypertrophy of the ductal epithelium obstructs the lumina of the ducts. It will be seen then that if the breast is to return to its resting phase completely there must be a balance between secretion and absorption, a condition which is under the control of the internal secretions of the anterior pituitary gland and ovary.

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* Read before the George Washington University Medical Society, October 19, 1935.

If the luteal phase of the ovarian secretion is prolonged there will be overstimulation of the breast with consequent increased epithelization and hypersecretion. During the intermenstrual phase the breast will not be able to regress to the resting phase, and the result will be distention of the acini with desquamated cells and unabsorbed secretion, with hyperplastic interacinar connective tissue infiltrated with lymphocytes. With the new luteal phase coming on with the next premenstrual period more stimulation is applied and further distention of the acini and ducts will occur. It becomes evident now why these breasts feel full and are swollen and painful. Cheatle and Cutler have named this breast condition 'Mazoplasia' to indicate that this is a functional disorder and is physiological in the sense that it merely represents an incomplete return to the physiological normal. Mazoplasia, these authors maintain, is in no way related to cyst formation or malignancy and that the only pathological condition that may follow mazoplasia is fibro-adenoma. The work of Lewis and Geschickter seems to bear out the relationship of fibro-adenoma formation with the ovarian secretions. That this is not altogether theoretical has been proven by clinical therapeutic results obtained by Cutler who used ovarian residue orally to overcome the luteal phase and thus relieved a very large percentage of patients with painful breasts. Whitehouse has used theelin by injection to accomplish the same result. Taylor says that ovarian residue is useless in painful breasts but follicular hormone and anterior pituitary hormone injection may help. He used X-ray radiation over the ovaries in selected cases with good results. Cheatle and Cutler would differentiate mazoplasia from cystic disease of the breast, which they call "cystiphorous desquamative epithelial hyperplasia," which another author has shortened to 'cystoplasia.' To them chronic cystic mastitis is a misleading, erroneous term which should be discarded. Whitehouse agrees that the term chronic cystic mastitis should be discarded, but he believes that mazoplasia is a forerunner of cystic disease of the breast. Pickhardt, however, from his own experiments on animals, claims that chronic cystic mastitis can occur only if there is obstruction in the ducts, plus inflammation, plus a disordered hormonal secretion.

And now what about the relation of so-called chronic cystic mastitis to malignancy, which after all is the main reason of interest in the whole question? Every one is agreed that those breast conditions described as mazoplasia are benign. But what about the cystic states? Does cystic disease of the breast develop into cancer or not? Kilgore, in a critique on the question, has given an excellent review of the subject. Cysts of the breasts may be divided into the non-hyperplastic type, in which the lining epithelium is flattened and atrophic and even absent; and the hyperplastic type in which there is formation of intracystic papillomata, the so-called papillary cystadenomata.

Opinion on the relation of these cysts to malignancy is divided into three groups:

1. Those who agree with Cheatle and Cutler that all cystic disease of the breast is precancerous, and should be treated radically.
2. Those who agree with Bloodgood, who from clinical experience has concluded that there is no relationship between cystic disease of the breast and malignancy.
3. Those who consider the non-hyperplastic cystic states as benign and who would treat radically only those cysts which show hyperplasia.

Kilgore believes that although the preponderance of evidence is in favor of Bloodgood's concept, a good deal of clinical judgment should be used in the treatment of hyperplastic cystic disease. If it occurs in a woman at an age when the breast function is no longer important and cancer incidence is apt to be high the sacrifice of the breast would be logical. One could be more conservative in the case of younger patients, unless there is a definite suspicion of malignancy or if a large portion of the breasts were involved.

Summary

1. It is the opinion of recent investigators that chronic cystic mastitis is a misleading and erroneous term and should be discarded.

2. In the light of recent study of the breast physiology painful lumpy or "shotty" breasts are the result of disordered function and can be treated conservatively with attention to the hormonal secretions of the ovary and pituitary glands.

3. Cystic states of the breasts are to be considered with less suspicion so far as their relation to malignancy is concerned, with the exception of those hyperplastic states occurring in patients of the cancer age.

4. It is to be emphasized that all these remarks do not apply to "lumps" found in the breast. All lumps are carcinomatous unless proven otherwise. I am discussing here only those breasts known as chronic cystic mastitis or so-called "lumpy" breasts or "shotty" breasts.

BIBLIOGRAPHY

Cutler, M.: The Cause of "Painful Breasts" and Treatment by Means of Ovarian Residue. J. A. M. A., 1931, **96**, 1, 201.

Kilgore, A. R.: Breast Cysts and Cancer. Internat. S. Digest, 1935, **19**, 195.

Lewis, D., and Geschickter, C. F.: Gynecomastia, Virginal Hypertrophy and Fibro-adenomas of the Breast. Ann. Surg., 1934, **100**, 779.

Pickhardt, O. C.: Chronic Cystic Mastitis. Ann. Surg., 1932, **96**, 151.

Rodman, J. D.: Chronic Cystic Mastitis. Ann. Surg., 1932, **96**, 149.

Taylor, H. C., Jr.: Gynecological Aspects of the Etiology and Treatment of Chronic Mastitis. Surg., Gynec. & Obst., 1933, **57**, 627.

Whitehouse, H. B.: Mastopathia and Chronic Mastitis. Surg., Gynec. & Obst., 1934, **58**, 278.

TUBERCULOSIS ABSTRACTS*

Tuberculosis Among Negroes in the South: Briefly the deplorable situation in the Southern States comprising this Conference was made manifest through the following facts. The total population of the 13 states represented is approximately 35,000,000 of which Negroes comprise approximately 10,000,000. While less than one-third the total population is colored, more than half of the deaths from tuberculosis are to be found among the Negroes, the average death rate from tuberculosis among Negroes being almost three times that among the whites. The Southern States comprising this Conference, possessing only 16 per cent of the national wealth, must meet the needs (social, economic and physical), of 75 per cent of the nation's Negro population.

The importance of environmental conditions, arising chiefly through ignorance, poverty and neglect, was repeatedly stressed. The annual economic loss from tuberculosis deaths and morbidity among Negroes is very great.

The significance of occupational contacts was also emphasized and attention was called to the fact that through domestic and other personal services, approximately 50 per cent of the adolescent and adult colored population is brought into close touch with white children at their most susceptible age, thus providing perpetual seeding of a most fertile soil. Recent statistical studies were presented, revealing the significant fact that school children from the homes of those who employ Negro domestics show a much higher percentage of infection as revealed by tuberculin tests than those from the homes of people who live reasonable well but who are unable to employ domestic help.

It was shown that in spite of the high incidence, morbidity and death rate from tuberculosis in the Negro, there is a serious paucity of sanatorium beds for Negroes. The annual number of deaths from tuberculosis among Negroes in the South is approximately 11,000 with only 2,000 available sanatorium beds. The *deaths* among the whites approximate 10,000 with sanatorium facilities approaching one bed for every death. It was made obvious that poor housing, overcrowding in unhygienic surroundings, insufficient food, and the consequent massive infection among Negroes make sanatorium care imperative. . . .

Preventive and Therapeutic Measures: The obvious influence of ignorance and poverty upon the incidence, morbidity and death rate was stressed. The need of education was repeatedly emphasized, with stress upon the importance of health education in the schools and churches through public health agencies, with particular emphasis upon the work of the public health nurses. The need of trained colored physicians and colored public health nurses, with a discussion of ways and means of providing the same, received detailed consideration. Schools and special teaching clinics for the training of colored doctors and nurses for service in the prevention, diagnosis and treatment of tuberculosis were advocated. It was urged that training for Negro doctors should include adequate provision for fundamental instruction of undergraduates in the epidemiology, diagnosis and treatment of tuberculosis in medical schools for Negroes, also intern and resident service for Negro doctors in sanatoria and in the tuberculosis wards in general hospitals.

Health education in Negro colleges was suggested as a means of preparing the way for general health education, since a large per cent of college graduates become school teachers. The desirability of providing racial leadership was emphasized. The character and quality of papers and discussions presented by colored doctors at this conference may be considered prophetic of future achievements along this line. The affiliated collateral meetings for colored people initiated at the Houston Conference also mark a resounding note of promise.

The question of sanatorium beds for Negroes was discussed and a committee appointed to pursue this need. The Burr Cottage, the screened porch, and other improvised home facilities were discussed in connection with home treatment. Artificial pneumothorax in ambulatory cases among Negroes was advocated as a public health measure and as being significant from an epidemiological standpoint.

Ultimate Conclusions: This meeting made obvious the necessity of squarely facing the tuberculosis problem among Negroes in the South, if we hope to make further progress in tuberculosis control as it concerns the population as a whole.

Both the medical and sociological phases of the problem received careful consideration. The program, throughout, was characterized by a frank expression of opinion. All questionable teachings and procedures were scrutinized with distrust, while all facts established by science and tried by experience were eagerly received. Through the discussions ran a coveted consciousness of the adequacy of medical science in the control of tuberculosis, saddened by an equal awareness of the inadequacy of its application to the problems of control. It was evident that the failure to meet social and economic needs stands prominently in the way of scientific progress.

The implications of lethargy and neglect rest upon the shoulders of both the professional and lay groups. It was agreed that there should be no passive moments; no resting on the oars, while waiting for better facilities. The resistant qualities of crass ignorance and superstition still found in the strongholds of poverty is like granite, and yields only to the perennial operation of elements which reach their destiny through gradual erosion.

The spirit characterizing true public health work was shown to be synonymous with genuine religion, and consists not in getting, but in giving.

The facts assembled seemed to warrant the conviction that the crusader against tuberculosis should wear a composite garment with medical science, common sense and measured sentiment as its chief components.

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* National Tuberculosis Association.

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(*Continued from January, 1936*)

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LESS COMMON TYPES OF ENCEPHALITIS AND MYELITIS

Inflammation of the brain and of the spinal cord is fairly frequently met with in the course of infectious diseases, the symptomatology of which is not predominantly of nervous origin. It is also seen, in non-purulent form, in the course of various intoxications. The first form is most often seen in children in conjunction with, or following, the common exanthemata, such as measles, scarlet fever and chickenpox. Within recent years true encephalitis, or encephalomyelitic syndromes have been reported following vaccination and antirabic inoculation. The pathological picture in all of these is quite similar and consists of demyelinization, axonal degeneration and scattered areas of inflammatory reaction.

The clinical picture of the encephalomyelitis complicating the exanthemata is also common to all types. There is usually a sudden rise in temperature, pains in the neck, back and extremities, stupor or coma, convulsions, scattered paralyses and reflex changes. Vomiting and medullary symptoms such as dysphagia are common. There are only two courses to this disease—either the patient dies within a very few days, or, as is fortunately true in the majority of cases, improvement sets in, to proceed slowly to practically complete recovery. In all of these cases there is very suggestive evidence that the cerebral symptoms are in inverse ratio to the severity of the skin manifestations.

At various times and in widely separated localities, cases of encephalomyelitis have been reported following vaccination against smallpox. At times the disease appeared to be almost epidemic in character. Symptoms usually appeared about 12 to 15 days after vaccination and resembled very closely those mentioned in connection with the exanthemata. The mortality varied somewhat but in general was quite high, usually 30 to 50 per cent, the remainder again escaping with little or no sequelae. In all of the above-mentioned types of encephalomyelitis, abnormal spinal-fluid findings were minimal or absent.

Of the encephalitic syndromes associated with intoxications the commonest (comparatively) are acute alcoholic poliencephalitis of Wernicke and arsphenamine encephalitis. The etiology of the first is undetermined but is found almost exclusively in chronic alcoholics. The pathologic changes are usually limited to the midbrain in the region of the aqueduct and consist of a combination of inflammatory changes with multiple small hemorrhages. It is usually not associated with acute alcoholic symptoms. There are frequently noted headache, vomiting, stupor, and most important of all, a variety of disturbances of pupillary reactions and paralyses of the extra-ocular muscles. The course of the disease is quite irregular, frequently resulting in death within a week or two, and just as frequently in recovery with or without sequelae. Arsphenamine encephalitis is, naturally, precipitated by injection of various arsphenamine preparations. It is an extremely rare but very serious complication of antiluetic treatment and may occur at any stage of treatment. Symptoms usually appear within a few hours of the administration of the drug and consist of rapidly progressive stupor and coma, sometimes delirium and convulsions. The pathological picture is that of marked edema of the brain with multiple scattered hemorrhages.

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* This is the fifth instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates. Other instalments will follow until completion.

DIAGNOSIS OF ENCEPHALITIS AND MYELITIS

The clinical diagnosis of most forms of encephalitis and myelitis is usually not difficult, but the separation into etiological types is oftentimes arrived at only after a long period of observation combined with painstaking clinical and laboratory study.

Syphilitic Encephalitis and Myelitis. It must again be stressed that the various types of syphilitic cerebrospinal disorders cannot be too narrowly classified and that in their diagnosis a certain degree of latitude is always indicated.

The diagnosis of disseminated syphilis of the central nervous system is based principally upon a history of infection, the detection of signs pointing to diffuse involvement of the central nervous system, vague and not very marked mental symptoms, and especially a positive blood or spinal-fluid serological reaction or both, with increase of lymphocytes and protein in the spinal fluid and variable changes in the colloidal gold curve.

General paresis is most easily diagnosed by the combination of evidence of progressive mental deterioration, pupillary abnormalities, tremors and increase in deep reflexes with positive blood or spinal-fluid serological reactions, pleocytosis and protein increase in the spinal fluid and the fairly common "paretic" gold curve. Emphasis should be placed upon the mental symptoms which alone serve to dignify this condition as a separate syphilitic syndrome.

Tabes dorsalis presents the picture of progressive involvement of sensory structures of the cord combined with pupillary disturbances, frequently of the Argyll Robertson type, diminution and loss of deep reflexes, and evidence in blood or spinal fluid of syphilitic infection.

Epidemic Encephalitis. Diagnosis of this condition is sometimes extremely difficult and, unfortunately, is frequently not made until the appearance of fairly characteristic sequelae. As a general rule, there is some degree of disturbance of consciousness associated with signs referable to involvement of midbrain structures, such as ptosis, diplopia, pupillary and extra-ocular muscle disturbances. Blood and spinal-fluid serological reactions are negative for syphilis, and the absence of marked cellular increase in the spinal fluid with normal sugar and chlorides serve to rule out the usual infections of bacterial etiology. The chronic encephalitic states may be easily recognized as a rule by the presence of spasticity and tremor in the absence of signs of cerebral vascular involvement.

Poliomyelitis. This disease is usually very easily diagnosed by the history, which is frequently one of upper respiratory infection, abdominal distress, and pain in the neck and back, combined with muscular weakness, flaccid paralysis of scattered muscle groups, and loss of deep reflexes. Diagnosis of the disease in the pre-paralytic stage is often impossible.

Sydenham's Chorea. Choreiform movements appearing in a young person with a history of rheumatic fever or frequent tonsillitis, or with evidence of cardiac disturbance is almost pathognomonic of Sydenham's chorea. It may be distinguished from Huntington's chorea by the absence of familial incidence.

Less Common Types. Central nervous system symptoms including stupor and diffuse focal signs appearing in the course of an acute infectious disease or following shortly after vaccination strongly suggests the encephalitis seen in these conditions. Should the general signs of cerebral disturbance be combined with objective signs of midbrain involvement in a chronic alcoholic, Wernicke's alcoholic poliencephalitis may be presumed to be present. The diagnosis of arsphenamine encephalitis is usually obvious.

TREATMENT OF ENCEPHALITIS AND MYELITIS

Syphilitic Encephalitis and Myelitis. The treatment of these diseases must always be highly individualized and each patient considered as a distinct therapeutic problem, not merely as an example of a certain type of disease. Thorough general physical examination is essential before the institution of treatment with special attention directed toward the condition of the cardiovascular and renal systems. Treatment must be thorough, must be continued over a long period of time, and must be combined with frequent physical, mental and serological examinations.

Disseminated syphilis of the central nervous system is usually best treated by a combination of the arsenicals and the metals, mercury and bismuth, in alternate courses of 6 to 8 injections each. Malarial inoculation should be held in reserve as a weapon to be used should the therapeutic response to routine treatment be unsatisfactory. In gauging the results of treatment due consideration should be given clinical improvement as opposed to merely serological cure, as the latter is sometimes an unreliable measure of cure.

General paresis, once definitely diagnosed, practically always calls for the institution of malarial therapy, or some other reliable form of hyperpyrexia, in the absence of serious organic disturbance, other than cerebral, that might contraindicate it. In an extremely deteriorated patient a preliminary course of tryparsamide very often renders him a better subject for this form of treatment due to the improvement in the general physical and mental condition that it may temporarily effect. Tertian or quartan malaria may be used, the latter being somewhat preferable because of the longer period between paroxysms. The injection should be given both intramuscularly and intravenously, 3 to 5 cc. of malarial blood being injected by each route. The first paroxysm usually occurs in from 1 to 4 weeks after injection. The average course should consist of at least 10 paroxysms, preferably 14 to 16. During this period attention should be directed toward the patient's general physical condition and certain specific complications watched for. The commonest of these are cardiac decompensation, undue enlargement of the spleen and severe secondary anemia. At the end of the course the malaria may be cured by large doses of quinine (20–30 gr. q. i. d.) for a week, followed by smaller doses for several more weeks. Should the quinine not be tolerated arsphenamine or atabrine may be used. Following malarial treatment the patient should be given routine treatment with bismuth and tryparsamide for a considerable period of time. In the course of treatment with tryparsamide the question of optic nerve damage should be borne in mind. It is well to remember that such a complication is extremely unusual, and that subjective symptoms such as scintillating scotomata and blurring of vision occur some time before serious damage is done to the optic nerve. Should such symptoms be complained of reduction of the dosage is indicated. Following malarial therapy the first objective sign of recovery is in the decrease in the cellular and protein content of the spinal fluid. A positive Wassermann reaction may persist for a very long time.

Tabes dorsalis presents a rather discouraging therapeutic problem. In its very early stages the outlook is rather hopeful, decreasing with the age of the disease. Mercury, bismuth and arsphenamine are all indicated in regular dosage. Malaria is sometimes beneficial, but the results are not by any means as good as in paresis. The progress of the disease may be arrested, but complete restoration of function is practically never obtained. In the presence of severe gastric or other crises chordotomy is indicated but is an extremely serious operation. Reëducation by Frenkel's exercises may be of great benefit to the coöperative patient.

Epidemic Encephalitis. Until recently the treatment of acute epidemic encephalitis was largely symptomatic. It consisted principally of sedatives and antipyretics combined with intravenous injections of hypertonic glucose and rectal instillation of magnesium sulphate, these latter measures being aimed at the treatment of the cerebral edema presumed to be present. A certain number of cases, particularly those with generalized rather than focal signs, responded well. More recently the method of forced spinal drainage proposed by Kubie and Retan, and previously described in these articles, has shown very encouraging results and should probably be resorted to whenever the seriousness of the situation warrants.

The treatment of chronic encephalitis is principally by the use of hyoscine and stramonium. This mode of action is not well known, nor is the reason for their success in certain cases and their failure in others. At times one will succeed where the other has been ineffective. Certain points in their use must be stressed, namely, that chronic encephalitics in general can tolerate very large doses of both and that the medication must be pushed to the limits of tolerance. Hyoscine should be given in the form of the hydrobromide, beginning with 0.00043 Gm. (gr. 1/150) t. i. d. and increasing until annoying symptoms such as extreme dryness of the mouth or other symptoms such as excessive drowsiness become too marked. Stramonium is best prescribed in the form of the dried compressed leaf and should be given in doses of 0.166 Gm. ($2\frac{1}{2}$ gr.) increasing gradually until symptoms appear similar to those of hyoscine overdosage.

Poliomyelitis. This disease has recently become the center of therapeutic controversy. Certain broad principles, however, still hold true. It is seldom diagnosed before the onset of paralysis and at that time active therapy, such as convalescent serum, is of no avail. The value of transfusion is questionable. The important measures are complete rest and support for the paralyzed parts and absolute prohibition of active physiotherapy, such as massage or exercise, until all pain has left the affected limbs. These should be wrapped in cotton wadding and such supports as light splints to prevent foot-drop or contractures applied. After the pain has disappeared active massage and orthopedic exercises may be instituted and other orthopedic appliances recommended as indicated.

The true treatment of poliomyelitis is in its prevention, and several types of sera have been suggested and tried. So far these are not entirely unobjectionable, since they are either ineffective, such as those consisting of a killed virus, or may fan a latent or asymptomatic case into activity. This is probably true of sera consisting of the attenuated virus, the use of which, especially during an epidemic, has at times resulted in extremely unfortunate sequelae. Mass inoculation with this serum in the absence of an epidemic appears much more reasonable. At any rate recent progress has been quite encouraging, and it is quite probable that more hopeful methods of control may be expected in the near future.

Sydenham's Chorea. This disease is best treated by a combination of rest and mild sedatives along with the elimination of such foci of infection as may possibly be implicated. More recently extremely encouraging results have been reported by artificial hyperpyrexia induced by typhoid vaccine injection.

Less Common Causes. The treatment of the encephalitides associated with vaccination or the exanthemata is still entirely symptomatic. This should consist of rest and sedatives and efficient nursing care. While few cases have been reported it is quite possible that forced spinal-fluid drainage may be of value. The treatment of alcoholic poliencephalitis also is symptomatic to a large extent. Intravenous glucose and spinal puncture may be of benefit. Arsphenamine encephalitis should be treated by intravenous injections of adrenalin (5–15 minims of 1–1000 solution), glucose, and sodium thiosulphate.

ABSCESSES

Brain and spinal cord abscesses are practically always more or less localized and circumscribed areas of infection that are secondary to a focus elsewhere in the body. Of these foci the commonest is the middle ear and mastoid, then the other para-nasal sinuses and finally the truly metastatic abscesses resulting from primary infection in some far removed focus.

INVASIVE PYOGENIC ABSCESSES

Etiology. Any of the common pyogenic organisms may cause such abscesses, the commonest in order of incidence being the staphylococcus, the pneumococcus, the streptococcus and the colon bacillus. Approximately 90 per cent of these are the result of a primary infection of the middle ear.

Physiological and Pathological Considerations. In such cases infection reaches the central nervous system in 3 ways. It may proceed directly by progressive involvement of all structures in its path and result in osteomyelitis, then epidural abscess, then circumscribed meningitis and finally brain abscess. It may extend along lymph pathways or, as is probably quite common, may proceed by retrograde thrombosis of the cerebral veins and cause abscesses far removed from the original focus. Abscesses may result from fracture of the skull and secondary infection, and may also result from accidental trauma during sinus operations. The truly metastatic, blood-borne abscesses most often result from lung abscess. Epidural abscesses may remain localized outside the dura or may extend to involve the parenchyma itself. Pathologically, brain abscesses closely resemble abscesses elsewhere, with a central core of infection surrounded by a reactive wall of white cells. At first the abscess is merely a localized encephalitis which may spread to cause extensive and diffuse involvement of the brain. Following mobilization of the defenses of the body encapsulation frequently takes place. This stage may persist for days, months or years. It may continue, as a matter of fact, until death supervenes from other causes. Generally, however, at some time the reactive encapsulating wall breaks down and infection is released which usually results in fatal meningitis. On the other hand, the contents of the abscess may become sterile and liquified, with resultant cyst formation. The great majority of abscesses are located in the temporal lobe and the cerebellum. Preceding or accompanying the abscesses may be phlebitis and thrombosis of cerebral sinuses, usually the lateral sinus. Abscesses in the spinal area are usually epidural and most often the result of extension from contiguous foci, such as Pott's disease of the spine.

Symptoms and Signs. These are usually three-fold: Evidence of infection, of increased intracranial pressure, and of focal nervous system damage. The onset is usually gradual with intermittent, low-grade fever, malaise and frequently loss of weight. Leukocytosis is usually present but rarely high. This is often followed by severe headache, vomiting, drowsiness and slowing of the pulse. The focal signs depend upon the location of the lesion. Deeply seated temporal lobe abscesses may cause homonymous hemianopsia or slight hemiplegic signs. If on the left side, various forms of aphasia may result, usually of the sensory type. 'Jargon' aphasia is fairly common. Cerebellar abscesses often cause more intense signs of increased pressure as well as such suggestive focal signs as ataxia, vertigo, and nystagmus. The fundi may show only a slight degree of edema, or, on the other hand, well marked choking of the discs. Abscesses in the posterior fossa often give rise to some stiffness and pain in the neck. It must be emphasized that the above symptoms are not definitely indicative of abscess but must be interpreted in the light of a previous history or physical findings of infection elsewhere in the body, particularly in the middle ear or paranasal sinuses.

The spinal-fluid findings depend to some extent upon the stage of the disease. During the latent period there may be only a slight increase in pressure with slight increase in lymphocytes. During the succeeding stage of activity and increase in symptoms the cerebrospinal fluid pressure is usually definitely elevated and the protein content increased. If the abscess is fairly superficial, or its extension rapid, polymorphonuclear cells appear in considerable numbers. In the terminal stage the findings are those of any purulent meningitis.

Course and Prognosis. The course of brain abscess is unpredictable. Death from fulminating meningo-encephalitis or sinus thrombosis may occur during the early stages. The abscess may be encapsulated and give rise to few symptoms for many years. Usually, however, something occurs which causes reactivation of the process at some time, and death results usually from pyogenic meningitis if the cerebral infection extends to the ventricles or the subarachnoid space.

EMBOLIC ABSCESSES

Etiology. These are practically always of streptococcal origin, since they are usually caused by emboli from cardiac valvular vegetations. The pneumococcus and other organisms causing endocarditis are occasionally found.

Physiological and Pathological Considerations. Such abscesses are the result of infected, blood-borne implants which usually result in occlusion of small cerebral vessels, from which the infection spreads to the surrounding tissue. They may lodge anywhere in the nervous system, but their pathological characteristics are similar to those of the previous group.

Symptoms and Signs. The onset of the condition shows a good deal of variation. Should the embolus lodge in a silent area of the brain the course will be similar to that of other abscesses with gradual increase in symptoms as the rule. On the other hand, the onset is frequently acute with sudden hemiplegia or monoplegia, hemianopsia or convulsions. Sudden coma is rare. Following this the other signs of cerebral infection are added to the focal disturbances. Signs of bacterial endocarditis are usually present and supply the clue to the origin of the disturbance.

Course and Prognosis. Since this is frequently a terminal manifestation of bacterial endocarditis the course is always fatal, due either to septicemia and anemia or to the effect of the cerebral infection in an already debilitated organism.

GUMMATOUS ABSCESSES

Etiology. These are always spirochetal in origin and are comparatively rare manifestations of cerebral syphilis.

Physiological and Pathological Considerations. Gummata are usually rather late manifestations of syphilitic infection and as stated are quite rare. They appear to develop first in the meninges in the majority of cases and invade the brain tissue secondarily. The pathological picture is similar to that of gummata elsewhere. They rarely break down or produce syphilitic meningitis but in general cause symptoms similar to those of brain tumor, presenting both general and focal symptoms. Since they usually destroy brain tissue as they expand, symptoms of marked increase in intracranial pressure are rather unusual and focal signs much more common. They are most often found involving the surface of the brain and are frequently multiple.

Symptoms and Signs. As has been already stated the signs and symptoms of cerebral gumma are principally those of focal involvement, with a distinct tendency toward gradual increase in the elements of the clinical picture. Obviously the location of the gummata determines the presenting symptomatology. In view of the fact that gummata are prone to invade the cortex a point of some clinical significance is the early appearance of convulsions that are frequently of the Jacksonian type. Blood and spinal-fluid Wassermann reactions are usually positive.

Course and Prognosis. In the absence of appropriate treatment cerebral gummata usually continue to grow and cause death either through marked increase in intracranial pressure, involvement of vital structures, or erosion into vessels such as the great cerebral venous sinuses.

ABSCESSES DUE TO LESS COMMON CAUSES

These are legion and may be caused by a variety of micro-organisms and fungi. Tuberculous abscesses or tuberculomata are seen fairly often and usually result, at some time, in the production of a fatal tuberculous meningitis. In general, the pathological pictures are strikingly similar and the clinical symptomatology as well. All produce general as well as focal symptoms. All of them if untreated have a poor eventual prognosis. Most of them are difficult to diagnose etiologically unless another focus of infection elsewhere gives the clue.

DIAGNOSIS OF ABSCESSES

Invasive Pyogenic Abscesses. These are diagnosed by the history of acute or chronic infection, usually of the middle ear or nasal sinuses, evidence of infection, and general or focal signs of cerebral involvement with some increase in spinal-fluid pressure and cells.

Embolic Abscesses. These are seldom difficult to diagnose. The fulminating onset which is common, or the rarer gradual onset, accompanied by evidence of bacterial endocarditis is quite typical.

Gummatous Abscesses. These may be presumed to be present when there are progressive focal cerebral involvement, convulsions, slight signs of increased intracranial pressure and serological evidence of syphilis.

Other Abscesses. Abscesses of uncommon etiology depend for their diagnosis upon the general signs of cerebral abscess along with findings of infection elsewhere, usually in contiguous foci.

TREATMENT OF ABSCESSES

Invasive Pyogenic. These must be treated according to the stage of the infection. During the early acute stage preceding localization, treatment must be strictly conservative. Infected foci such as an otitis media may be drained, but operation on the brain is definitely contraindicated and is always pointless and fatal at this stage. It is generally agreed that operation should be deferred for 6 weeks or longer to permit of thorough encapsulation. Following encapsulation and the subsidence of acute symptoms two types of operation may be performed, either needling of the abscess through a small burr hole or widely open drainage after the establishment of meningeal adhesions. Of the two operations the first is probably the better. Both are operations of considerable seriousness, and the mortality even under ideal circumstances is still high.

Embolic Abscesses. For obvious reasons these cannot be expected to respond to any form of treatment. Evacuation of the abscess may occasionally serve to prolong life for a short time.

Gummatous Abscesses. Once diagnosed, these lesions should be attacked by vigorous antiluetic therapy in which the iodides should have a prominent place. However, it must be remembered that the results of antiluetic therapy are sometimes slow, and in the presence of increase in intracranial pressure and especially if vision is failing, treatment should be preceded by a decompressive operation.

Other Abscesses. In general, abscesses of other origin conform to the rules laid down for the treatment of the common invasive pyogenic group. In the fungus infections, potassium iodide is of value. Tuberculous abscesses in the latent stage present a very delicate problem, but since they are such a potential source of danger, and since surgical instruments and technic have progressed so rapidly of recent years, operation and removal of the tubercle with a wide area of surrounding healthy tissue is usually indicated.

(To be continued)

Acute Fluorin Poisoning: With Report of Five Cases.—. . . In the first group of three cases reported, fluorid was taken in the form of sodium fluorid after being mistakenly sold for sodium bicarbonate and ingested with the same impression persisting. As far as can be determined, approximately half a teaspoonful, or three to four grams, was taken in these cases, with death following in from six and one half to twelve hours. . . .

Suicidal Poisoning Group. The second group of two cases were the results of voluntary suicidal ingestion and, while no histories are, of course, available, it appears by the amount of insecticide remaining in either can that something less than an ounce of the material was taken. Both individuals were found dead in the morning, having died during the preceding night. Fluorid was recovered from the stomach in both instances. . . .

Conclusions:

1. Five cases of acute fluorid poisoning are reported which corroborate the clinical and pathologic findings of previous reports.
2. Terminal cutaneous petechial hemorrhages are observed, and their presence attributed to the anti-coagulant action of fluorin.
3. The mechanism of fluorid toxicity is probably due to a combination of formation of an insoluble calcium salt, and by the interference of the action of enzymes and lactic acid metabolism.
4. Three grams is a sufficient quantity to cause death in man.
5. Gastric lavage and subsequent stomach washing with lime water, milk, or other calcium salts, are at present the most proper treatment.

Extract from article by JESSE L. CARR, M.D., *San Francisco: California and Western Medicine, February, 1936, p. 83.*

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THE PRACTICING PHYSICIAN AS A PUBLIC HEALTH ADMINISTRATOR

In many ways both the local and national governments have considered the practicing physician a health deputy. The maintaining of vital statistics as to deaths and births, the compilation of morbidity rates, depend quite entirely upon the coöperation of the licensed practitioner. Care and accuracy observed by the doctor in filling out records means useful statistics. The local full-time health official will be able to know rates of disease incidence and the National Bureau of Census can furnish data from which inferences may be made that are of inestimable value in disease prevention. The improvement of the records has advanced *pari passu* with advances in medical science and the progress in medical education. It can be recognized that certificates of death, or even birth certificates, reflect the intelligence and training of the physician. The cultist with poorly developed background, and further with a narrowed field of therapeutics as his alleged *raison d'etre*, should be obviously incompetent. Another matter is the reporting of communicable disease. The law definitely requires all physicians to report cases coming under their purview on official blanks. Penalties are provided for non-compliance. The time consumed in making out forms is considerable, but physicians have accepted the imposed responsibility without any thought of monetary remuneration or even, as prevails in most communities, any refund for postage or for clerical expense. Organized medicine in its publications, national and local, has always stood for cheerful compliance and greater care in answering what often seem to the uninitiated to be superfluous requirements, to the end that preventive medicine and ultimately the public weal may be best served.

VACCINATION—DIPHTHERIA PREVENTION

The law in many localities requires compulsory vaccination of school children against smallpox. Has the individual physician urged with sufficient force the vaccination of the child in infancy to bring about a locality free from smallpox? Diphtheria immunization* is a proven mode of prevention of a scourge. Do physicians do all that is possible to educate their clientele to avail themselves of this opportunity? It is not because organized medicine has not spoken in season and out, that 100 per cent of physicians do not act in this matter according to the best interest of the public and their own best interest. A corollary to all the foregoing has been the necessity for the immunization against both smallpox and diphtheria of large groups of children in schools and babies in welfare stations by full-time health officials or their paid agents at public expense. In many communities this work is actually performed by unremunerated volunteers from the regular profession. Many in the groups treated manifestly are able and willing to have their family medical adviser do this work if he would press its importance on his visits to the household. No statistics are available concerning the number of local children reaching school age without protection, but it is safe to say the percentage immunized by the family physician is shockingly low.

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* A recent report of diphtheria immunization from some 17 eleemosynary institutions in the District of Columbia with a total of 1,015 child inmates, as prepared by the Health Division of the Washington Council of Social Agencies, shows 30 per cent who have had the advantages of modern diphtheria immunization. Each institution has one or more attending physicians. Have these physicians made representation to the respective boards of these institutions that all children on admission should have at least smallpox vaccination and diphtheria immunization? If so, the responsibility for this showing must be placed on the respective boards.

PERIODIC HEALTH EXAMINATIONS

In the matter of routine physical examination the physician is again in the category of a deputy health official. By carrying out a plan of publicizing the importance of these examinations and actually participating in the performance on their own clientele, evidence of incipient heart, lung disease, and cancer could be re-revealed.† Preventive medicine would thus be best served. Such organizations as the American Heart Association, the National Tuberculosis Association and the American Society for the Control of Cancer have not been alone in the field of advocating routine and careful examinations. The American Medical Association has publicized the importance, made blanks available, and pushed the slogan "a complete physical examination on your birthday." Units down to the component county society of the state organization have taken up the campaign in a forceful manner.

No indictment of the practitioner of medicine as derelict in his duties is intended. The factor of lay acceptance of the principle of consulting the physician for a physical survey routinely, at definite time intervals, must be recognized. The wave of transition from the viewpoint of therapeusis for the obviously sick to the practice of the principles of disease prevention is progressing onward. There is much evidence that definite advance has been made, especially in eradicating the cause of disease in the lower age groups; much less striking is the success in combating the degenerative diseases. The individual practicing physician in lending his services so often gratuitously deserves credit for much of the progress gained. The American Medical Association, with its constituent bodies, is a living militant organization for promulgating principles of disease prevention and encouraging the individual practitioner to gain the proper knowledge and enthusiasm to accept his responsibility to the State as health deputy.

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The regular meeting of the Washington Society of Pathologists was called to order at 1:35 P.M., January 4, 1936, in the Army Medical Museum by the President, Dr. Wallace M. Yater. There were 68 members and guests present. The minutes of the meeting of December 7, 1935, were read by the Secretary and approved. Drs. Lewis C. Ecker, A. D. Daughton and D. C. Richtmeyer were nominated and unanimously elected to membership in the Society.

Scientific Papers

1. "GROWTH-TEMPERATURE AND ANTIGENIC CONSTITUTION OF B. TYPHOSUS." **Laszlo Detre, M.D.**, Research Associate, National Institute of Health.

The importance of growth-temperature to antigenic constitution was first stressed in 1932 by Harry Schutze (Lister Institute, London), who showed that plague-bacilli are encapsulated when grown at 37°C. and not encapsulated when cultivated at room temperature. The first contain a "capsular" antigen; the latter are devoid of this antigen. In 1934, A. Felix and R. M. Pitt showed that growth-temperature plays an important rôle in the characteristics connected with the virulence of B. typhosus. Virulent strains, when cultivated at 37°C., are characterized by resistance to somatic agglutinins; the same "inagglutinable" strains, however, become highly agglutinable when cultivated at 20°C., while losing at the same time their virulence. Inagglutinability and virulence were shown to be correlated properties, both depending on growth-temperature.

In further examining this question Felix and his coworkers (1934, 1935) published facts which seemed to indicate that in virulent typhosus cultures grown at 37°C. there is a new kind of antigen present, the Vi ("virulence") antigen which in some way hinders the somatic agglutination, and is the virulence agent. This Vi factor is a real antigen. It elicits corresponding Vi-antibodies in the animals immunized with bacilli grown at 37°C. Some discrepancies in the otherwise very valuable research work of Felix and his co-workers indicated that the question deserves systematic analysis.

The first typhosus strain examined by us was obtained

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† If the ideal could be reached of every one with a private medical adviser having an annual physical survey, there would be less necessity for a wide fact-finding campaign such as recently was witnessed in the District of Columbia, when some 9,010 X-ray studies were performed through the coöperation of the Medical Society of the District of Columbia with the organized health forces.

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through the kindness of Dr. H. H. Leffler, pathologist, of the Gallinger Municipal Hospital, Washington, D. C. It showed at first abnormally short bacilli, but in later subcultures there developed gram negative bacilli of rather normal appearance. Its biological behavior, examined by Miss Edna Smith in the National Institute of Health, showed normal characteristics. However, it failed to be agglutinated by our purely somatic antiserum (titer 1:1600), even in high concentrations. But after cultivation at room temperature it became perfectly agglutinable.

A second, very similar, strain was obtained from Dr. W. A. Randall (Georgetown University School of Medicine). It was isolated in September, 1935, by Miss Marion Wells at Hagerstown (Branch Laboratory of the Maryland State Department of Health) from a typhoid carrier responsible for a typhoid outbreak at Camp Springs. When grown at 37°C. it was inagglutinable, but when grown at 20°C. or room temperature, it became fully agglutinable.

Both strains, being recently isolated, apparently support the theory of Felix as to the relation of resistance to somatic agglutinins and virulence. This was all the more probable since the Georgetown strain was responsible for a typhoid outbreak.

Despite this, we decided to examine all typhosus strains of the National Institute of Health, and others too, for the influence of growth-temperature. Besides the two strains mentioned, 16 others were obtained from our collection: 4 ("Watson" and "Allahabad," 0901, H901) from the Army Medical School (Major A. P. Hitchens); 2 (0901 and H901) from the Chicago collection. Our findings based on the detailed antigenic analysis of 24 strains may be summarized as follows:

1. The 24 strains, without a single exception, showed differences in agglutinability by our purely somatic (granular) antiserums Nos. 17 and 18, both obtained from rabbits treated previously with the purely granular strain 0901. Their room-grown cultures were far better agglutinable.

A gamut of possibilities presents itself. For some strains (for instance, 0901 and 22) the differences are but gradual, and disappear within a few (2 to 3) hours; other strains, however, approach the basic finding of Felix, that is, they are almost completely inagglutinable when cultivated at 37°C., and fully agglutinable when grown at room temperature. Graphs illustrate this finding (demonstration).

2. It should be emphasized that the completely avirulent strains, 0901 and H901 of Felix, show a similar behavior to the other strains examined. For the strain, 0901, the differences are rather slight, but H901 acts in all respects like the other strains. This observation fails to support the theory of Felix about the causal relation of inagglutinability or lessened agglutinability and virulence.

3. Prolonged cultivation causes a remarkable and constant change in agglutinability. Room cultures of Watson's strain, for instance, show a gradual decrease in their agglutinability, when cultivated for 48, 72, 96 hours, instead of 24 hours. The 4-day cultures are almost inagglutinable. At 20°C. nearly complete inagglutinability occurred in 5 to 6 days. This indicates that agglutinability is dependent not only on the temperature but also on the duration of cultivation.

In accordance with this finding, by using special methods of research we showed that very young (2 to 3 hours old) 37°C. broth cultures of the Watson strain are agglutinable, while longer cultivation renders them completely inagglutinable.

4. For the practical application of these findings, we recommend that in cases in which a recently isolated typhosus-like organism has to be identified by agglutination tests, room-grown cultures should be used instead of cultures grown at 37°C. as has been the practice.

In the discussion, **Major Wesley C. Cox** asked, "Did you use the culture direct, or use an 'O' or 'H' standard agglutinable culture?" **Dr. Detre** answered, "In using the standard technic one gets complete agglutination if the time is continued, but it is the short time element in the culture that shows the difference." **Major Cox** asked, "Is there any colony difference between the room temperature or 37°C. cultures?" **Dr. Detre** answered, "The room temperature colonies are finer and smaller. Daughter colonies cannot be investigated by this technic after 3 days." **Major A. P. Hitchens** asked, "What is Dr. Detre's theory as to why room-temperature cultures are more agglutinable? Attention is called to Cabot's book in which Dr. Johnson long ago mentioned this phenomenon." **Dr. Detre** added that in replanting cultures there was a gradual transformation of "O" antigen into modified antigen.

2. "RECENT INVESTIGATION OF TYPHOID VACCINE AT THE ARMY MEDICAL SCHOOL." **Colonel Joseph F. Siler**, Commandant, The Army Medical School.

There have been many advances in bacteriology in the last 10 to 12 years, particularly as to the disassociation of bacteria. It has been found that antigenic properties change by temperature and chemical means.

In the typhoid vaccine manufactured at the Army Medical School and used since 1918 in the United States Army, Navy and recently in the C.C.C., the Rawlings strain has been used. Some people feel that this strain does not give protection against typhoid fever. This question comes up: Are the results after using a vaccine attributable to the vaccine itself? The Army began using vaccine in 1910. Since 1912 the use has been compulsory. The following statistics are interesting: From 1903 to 1908, 5 years before vaccine was used, there were 3.8 cases of typhoid fever per 1,000 hospital admissions. After compulsory use of the vaccine, from the 5 years, 1912 to 1916, 1.5 per 1,000 or 74 cases of typhoid fever were admitted. Of these 74 cases, 37 had not had vaccine, making 0.07 per 1,000 as the actual typhoid admission rate for these years. Another interesting study is shown in the death rate in the Army during these same periods. The death rate in the Army compared to that in other areas was as follows: From 1903 to 1908 there were 0.16 typhoid deaths per 1,000 in the Army, while in other areas there were 0.26 typhoid deaths per 1,000. From 1912 to 1916 there were 0.02 typhoid deaths per 1,000 in the Army, while in other areas there were 0.15 typhoid deaths per 1,000. This shows 87 per cent reduction in the Army rate.

Requirements for a vaccine as proposed by several authors are: The strain should recently have been isolated from a human; it should be highly virulent; it should be smooth, with much "O" antigen; it should have much Vi antigen; the strain should be isolated from carriers and should not be heat-killed.

In the experiments at the Army Medical School mice are used as test animals. It was determined that 15,000 mice would be needed. All of these have been obtained from one dealer, are of the same strain, and have been raised under the same conditions. Regarding the bacterial cultures the disassociation factor has been combated by freezing, drying and sealing *in vacuo*. In making vaccine the growing organisms have been washed off with veal infusion which has been found to be better than normal saline. There were 2 tests for virulence done on the mice. First, a preliminary test which consists of 5 concentrations of organisms, the concentrations being above and below the average lethal dose, this dose being the number of organisms killing 50 per cent of the animals; in the preliminary test 5 mice are used for each concentration. Second, there is a final test in which about 5 times the number of mice are used.

Seven strains of organisms have been used, namely, (1) Rawlings' intermediate strain, (2) Rawlings' smooth, (3) Rawlings' rough, (4) a 1-year old strain from a mild typhoid case, (5) a strain from a severe typhoid case, (6) a strain from Colonel Perry of England, consisting of an old, rough strain resulting from an old Rawlings' strain which had been passed through mice, and (7) a strain from an old typhoid carrier from Panama. Under the virulence test these strains soon showed much differentiation. The England, the carrier, and the "severe typhoid" strains were very virulent in contrast to the others which showed lower virulence. Mice were vaccinated and tested for virulence against each of these strains. The last post-immunity test required 6,200 mice, each having been vaccinated 3 times. The virulent strains gave the best protection. The Panama carrier strain, which we call No. 58, gave the very best protection; with this strain 16 times the average lethal dose showed 90 per cent protection.

Dr. Rake of the Rockefeller Institute of New York has shown that organisms in mucin were much more virulent. In the work on human blood from unvaccinated individuals medical students from Georgetown and George Washington Universities volunteered. Four vaccines were used for 4 groups of students, each group getting 1 of the 4 vaccines; namely, (1) a heat-killed Rawlings' strain vaccine, (2) a formalin-killed Rawlings' strain vaccine, (3) a heat-killed No. 58 strain vaccine, (4) a formalin-killed No. 58 strain vaccine. First, 30 cc. of blood was taken from each student, and then he was given 3 doses of vaccine. After 3 weeks 30 cc. of blood was again taken. The blood was tested for antibody. In the preliminary test 0.1 cc. of serum was injected into 4 mice. Then these mice were injected with 3 organisms, namely, the Panama No. 58, the Rawlings' strain, and a recently obtained very virulent organism. Before vaccination the students' serum injected into the mice allowed a dosage of only 10,000 organisms to kill the animal; after vaccination the students' serum protected the mice against 10,000,000 organisms. The present vaccine as now manufactured at the Army Medical School does not do as well as this last test. We hope to get better strains for making vaccine and hope to find better methods for testing vaccine. We feel that the present vaccine is good. One should remember that these results have been in mice; however, we hope the results will be the same in man.

In the discussion, **Dr. R. M. Choisser** brought up the question of vaccine by mouth: "Would it ever be of use?" **Colonel Siler** replied that at one time an organism was given by mouth which should have been killed by water bath before but was not, with unfortunate results. At the Army Medical School no work is being done now on immunizing by mouth. There is being carried on, however, work to determine the length of time of protection given by a specific amount of vaccine. **Dr. Oscar B. Hunter** wished to know what the status is of the opsinophagocytic index for diagnosing typhoid fever? **Colonel Siler** replied that this has not been tried at the School. **Dr. Laszlo Detre** asked, "Why not try other bacteria-killing methods for preparation of vaccines?" **Colonel Siler** concluded by stating that the Army Medical School is now using both heat-killed and chemically formalin-killed vaccines. As yet the better method has not been determined.

The meeting adjourned at 3:10 P.M.

Presentation of Cases

The second part of the meeting was called in the histology room at 3:40 P.M. Sixteen members were present.

Dr. Wallace M. Yater presented (1) a case of malignant tumor of the common bile duct in a white woman, aged 42 years. The history was read by Dr. L. M. Drennan and autopsy findings were reported by Dr. H. V. Connerty. The patient was admitted to Georgetown University Hospital on September 30, 1935, complaining of pruritus and jaundice. On August 27, 1935, the patient received an injection of arsphenamine in the arm because of syphilis. The evening after receiving the arsphenamine the patient vomited and had a chill and some fever. Jaundice was noticed 4 days after the injection of arsphenamine and was progressive from then on. The van den Bergh fluctuated between 12 and 25. The patient had had within 2 years 2 attacks of pain in the upper right quadrant with jaundice. Because of the apparent association with arsphenamine, however, hepatitis was considered most probable. When the jaundice persisted too long to substantiate this idea, laparotomy was performed by Dr. James A. Cahill, Jr., December 21, 1935. A mass was found to be located about 2.5 cm. above the ampulla of Vater, practically filling the lumen of the common bile duct and seeming to arise from the mucosa. Microscopic sections showed adenocarcinoma. The patient died on December 25, 1935, at 7 P.M. There were no metastases.

Dr. Yater presented also (2) a case of ruptured popliteal aneurism of the right leg studied by means of arteriograms before amputation of the limb.

Dr. P. M. Ashburn presented the case of an adult white male. There was a tumor from the bridge of the nose of several years' duration, approximately 4 cm. in diameter. The clinical diagnosis was fibroma. The histopathologic diagnosis was myxochondrocarcinoma of an aberrant salivary gland.

In the discussion, **Captain Elbert DeCoursey** agreed with the diagnosis of mixed tumor but questioned its carcinomatous designation and its salivary gland origin. **Major Raymond O. Dart** stated that a small-cell carcinoma of the pharynx was first called to mind with its high malignancy; however, this is probably not that type of tumor.

Dr. Oscar B. Hunter presented (1) Case 10157, a white female, who had had a hysterectomy 16 years before. She had had sciatica and other neuritides in the past year. The patient dated her illness from last November when she started having pain across the lower back. Last June she had pain on bowel movements, with protruding hemorrhoids. Lumbar puncture showed xanthrochromatic fluid which clotted easily. Paralysis of the legs developed. There was also partial spina bifida. The diagnosis was spinal cord tumor of the cauda equina. Laminectomy disclosed a tumor about 5 cm. long anterior to the cauda equina at the level of the second sacral vertebra.

In the discussion, **Major Raymond O. Dart** stated that the lesion seemed to be an angiomatous, almost cavernous tumor; whorls indicated meningioma or endothelioma of the dura.

Dr. Hunter presented also (2) the case of a woman who about 2 years before noticed swelling on the right side of the neck which gradually enlarged but at times receded in size temporarily. A linear incision and dissection revealed a tumor of the carotid body. When hemorrhage occurred Dr. R. E. Moran ligated the common carotid artery and removed the tumor.

In the discussion, **Dr. R. D. Lillie** suggested an endothelioma of the carotid gland. **Dr. Hunter** thought it was probably a chromaffin tumor.

Dr. Hunter demonstrated (3) a spongy, cancellous, bony tumor removed from the right antrum of a boy 13 years of age. The previous history indicated that the boy had a tooth removed at this site and subsequently developed what was thought to be a granuloma in the floor of the antrum. The mass continued to grow until it filled the antral cavity, when it was removed. It did not separate cleanly from the floor of the antrum, but was crumbly and came away in pieces. There had been no evidence of recurrence since removal, December 13, 1935.

In the discussion, **Major Raymond O. Dart** suggested an inflammatory ossification. **Dr. R. D. Lillie** stated that it was not an osteoma; at this site, cartilage should be present.

The meeting adjourned at 4:20 P.M.

COMING MEETINGS

Wednesday, March 4: Stated Meeting. Election of members of Nominating Committee for the selecting of personnel for various elective offices of the Society for the year 1936–1937; election of new members; reports of officers and committees, etc.

Wednesday, March 11: Joint meeting with the Section on Ophthalmology and Otolaryngology.
"The Veins of the Head and Neck and Their Significance in Otolaryngology." Oscar V. Batson, M.D., Professor of Anatomy, Graduate School of Medicine, University of Pennsylvania.

Wednesday, March 18: Joint meeting with the Washington Heart Association.

Annual Scientific Assembly
Medical Society of the District of Columbia
May 6-7, 1936

In addition to some 25 papers, scientific motion pictures and dry clinics to be given by local physicians, there will be heard 4 out-of-town speakers. It is planned to have one out-of-town speaker on the program of each of the A.M. and P.M. assemblies. Note the following on your calendar now:

"Diagnosis and Treatment of Tumors of the Large Intestines." William Wayne Babcock, M.D., Professor of Surgery and Clinical Surgery, Temple University, Philadelphia.

"New Developments in the Control of the Venereal Diseases." Walter H. Clarke, M.D., Director of the Bureau of Social Hygiene, New York City.

"Gastroscopy as an Aid to Diagnosis." Chevalier L. Jackson, M.D., Clinical Professor of Bronchoscopy and Esophagoscopy, Temple University, Philadelphia.

"Some of the Problems of Nephritis." James P. O'Hare, M.D., of the Staff of the Peter Bent Brigham Hospital, Boston.

A pleasing innovation will be the holding of a conjoint meeting on Wednesday afternoon, May 6, with the Medical Society of Virginia, Maryland and District of Columbia. A speaker at this afternoon session will be representative of this body.

The Technical and Scientific Exhibits now seem to be going to exceed, in type of the material presented and quantity, foregoing meetings. Some 14 firms will exhibit the latest appliances and accessories of use to the doctor. These scientific assemblies are in effect postgraduate courses brought to your door.

The social features of the complimentary luncheon to all Wednesday A.M. registrants and the dinner on the evening following, will have more than the usual interest. Register early Wednesday A.M., May 6; make reservation for banquet with Dr. Edmund M. Ellerson now. Tables will seat 10, as formerly.

NEWS AND PERSONALS

Pan American Medical Association

Washington, D. C., Chapter

December 22, 1935:

Meeting held at the Embassy of Cuba through the courtesy of the Ambassador, His Excellency, Sr. Dr. Guillermo Patterson. The Ambassador, in welcoming the Chapter, expressed his pleasure in coöperating with the Association in its purpose of making the medical profession in all American Republics better acquainted, recalling the names of Cuban physicians who have made permanent contributions to medical science, as Finlay, Albarran, and many others.

The program:

1. "Cancer of the Larynx." Chevalier Jackson, M.D., of Philadelphia. Discussion: Drs. George B. Trible, Victor R. Alfaro and P. S. Constantinople.
2. "Surgery as a Science and an Art." Dr. Gonzalez Arostegui (Habana, Cuba).

Dr. Arostegui, in a scholarly address, reviewed the qualities which the ideal surgeon must have to be successful in his profession, illustrating his talk with many quotations from medical and lay literature.

3. Motion Pictures of the Tour of the Pan American Medical Association to South America, in July, 1935, presented by Dr. Chevalier Jackson, of Philadelphia.

About 100 physicians were present. Distinguished guests included the Ambassador from Brazil, Sr. Oswaldo Aranha; the Ambassador from Mexico, Dr. F. Castillo Najera; and the Minister from Panama, Dr. Ricardo J. Alfaro.

January 9, 1936:

A joint banquet with the International Medical Association, in honor of Dr. Bernardo A. Houssay, President of the Academy of Medicine of Argentina, and Director of the Institute of Physiology of Buenos Aires, was attended by about 60 members of both associations. Distinguished guests included the Ambassadors of Argentina, Brazil and Mexico, and the Minister of Panama.

January 26, 1936:

Meeting held at the Embassy of Brazil through the courtesy of the Ambassador, His Excellency, Senhor Don Oswaldo Aranha.

The program:

1. "Trends in Traumatic Surgery." John J. Moorhead, M.D., of New York City.

A thorough review of the history, evolution and present scope of this branch of surgery.

2. "Diagnosis and Treatment of Diseases of the Colon." Wayne B. Babcock, M.D., of Philadelphia.

Presentation, accompanied by colored moving pictures of unusual cases, of some of the finer points of diagnosis and surgical treatment of difficult cases.

3. Motion Pictures of the Tour of the Pan American Medical Association in July, 1935, to Brazil, showing important scientific institutions and interesting views of the country. Custis Lee Hall, M.D.
4. "History and Present Status of Brazilian Medicine." Drs. W. Caldas Pires and Lenadro Tocantins, of Rio de Janeiro.

Dr. Pires dwelt on some of the leading figures of Brazilian medicine. Dr. Tocantins called attention to recent tendencies of Brazilian physicians gradually changing from European to American methods.

Distinguished guests included the Ambassador from Cuba, Dr. Guillermo Patterson; the Ambassador from Mexico, Dr. F. Castillo Najera; the Minister from Panama, Dr. Ricardo J. Alfaro; and Dr. Hugh H. Young, of Baltimore.

Louis Mackall Society

The Louis Mackall Society held its February meeting at the University Club. The program:

1. "Treatment of Epidemic Meningitis." M. W. Glover, M.D.
2. "Postoperative Pneumonia. Cause, Prevention and Treatment." Harry F. Dowling, M.D.

Howard H. Strine, Jr., M.D., *President*
R. Lomax Wells, M.D., *Secretary*

District of Columbia Dental Society

The Five State Postgraduate Clinic, under the auspices of the District of Columbia Dental Society, will hold its annual meeting at Wardman Park Hotel, March 8, 9, 10 and 11, 10 A.M. to 4 P.M. The program, Monday, March 9:

1. "The Importance of Focal Infection as Related to Health." Edward C. Rosenow, M.D., of Rochester, Minn.
2. "Oral Manifestations of Certain Systemic Diseases." Boyd S. Gardner, D.D.S., of Rochester, Minn.
3. "The Teeth and Bodily Health." William P. Murphy, M.D., Associate Professor of Medicine, Harvard University.
4. "The Comparative Value of Radiography in Dental Diagnosis." Clarence O. Simpson, D.D.S., of St. Louis, Mo.

Members of the medical profession are cordially invited to attend all sessions.

Washington-Baltimore Psychoanalytic Society

A Component Body of the American Psychoanalytic Association

The American Psychoanalytic Association, founded in 1910, met in Boston, December 28, 1935, at which time it adopted a new constitution. The Association, now a Federation of the American Psychoanalytic Societies, has as its membership the Boston Psychoanalytic Society, the Chicago Psychoanalytic Society, the New York Psychoanalytic Society and the Washington-Baltimore Psychoanalytic Society.

The following officers were elected:

A. A. Brill (New York), *Honorary President;* C. P. Oberndorf (New York), *President;* Isador H. Coriat (Boston), *Vice President;* Ernest E. Hadley (Washington), *Secretary;* Leo H. Bartemeier (Detroit), *Treasurer.*

George Washington University School of Medicine

The following professorial lecturers in preventive medicine are added to the faculty of the newly established curriculum in public health teaching:

George W. McCoy, M.D., Rollo E. Dyer, A.B., M.D., Edward Francis, B.S., M.D., LL.D., Charles Armstrong, M.D., Robert Olesen, M.D.

Recent additions to the general faculty of medicine follow:

Ralph E. Barris, A.B., M.S., Ph.D., Assistant Professor of Anatomy; Daniel J. Sullivan, M.D., Instructor in Neurology; Theodore J. Abernethy, M.D., Clinical Instructor in Medicine; Walter Kendall Myers, B.S., M.D., Clinical Instructor in Medicine; Crenshaw D. Briggs, B.S., M.D., Clinical Instructor in Surgery; Arthur James Mourot, B.S., M.D., Clinical Instructor in Surgery; Ellen Gray Acree, A.B., Research Associate in Bacteriology.

The Fourth Annual Postgraduate Clinic* will be held at the George Washington University School of Medicine and Hospital on February 29, 1936, 9 A.M. to 4 P.M.; banquet at Willard Hotel, 7:30 P.M. Dr. W. W. Herrick, essayist. Tickets obtainable from Dr. Beveridge Miller, Metropolitan 2161.

Program:

1. "Analysis of Routine Examination of the External Genitalia." Frederick A. Reuter, M.D.
2. "Unusual Case of Meningococcus Septicemia." J. Lawn Thompson, M.D.
3. "Observations on Total Thyroidectomy for Congestive Heart Failure and Angina Pectoris." Paul F. Dickens, M.D., and Charles S. White, M.D.
4. "Obstetrical Analgesia." Howard F. Kane, M.D.
5. "Outpatient Treatment of General Paralysis of the Insane with Malaria." Walter Freeman, M.D. (To be presented by H. D. Shapiro, M.D.)
6. "Treatment of Functional (Endocrine) Disorders in Females." (Presentation of Patients.) Jacob Kotz, M.D.
7. "Emergency Use of Murphy Button." Daniel L. Borden, M.D.
8. "Acute Purulent Pericarditis in Infancy." H. H. Donnally, M.D.
9. "Endometriosis." Radford Brown, M.D.
10. "Carcinoma of the Rectum." Paul S. Putzki, M.D.
11. "Use of Fluids in the Treatment of Shock." H. A. Davis, M.D.

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* Profession cordially invited.

12. "Treatment of Dyspituitarism." Raymond W. Murray, M.D.
13. "Treatment of Nephritis." Paul F. Dickens, M.D.
14. "Treatment of Angina Pectoris." W. LeRoy Dunn, M.D.
15. "Use of Paraldehyde in Obstetrics." Howard F. Kane, M.D., and Staff.

Dr. Jacob Kotz furnished an operating room in George Washington University Hospital as a memorial tribute to his mother, Mrs. Anna Kotz. On February 5, at 4 o'clock, a tea was given by the Board of Lady Managers to Dr. Kotz. The ceremonies and tea were attended by representatives from both the Board and the Faculty. The room, which is complete in modern detail, will add materially to the facilities of the Hospital. Inclusive is a mode of illumination which avoids shadows and gives off minimal heat. There is an auxiliary battery for emergency use.

Dr. John S. Arnold, who was one of the original physicians* in the medical inspection service of the Public Schools of the District of Columbia at the time of its institution in 1903, was retired as of December 31, 1935. At a reception at which Dr. Edith SeVille Coale acted as hostess, on the evening of January 18, 1936, and which was attended by the full staff of medical inspectors, Dr. Arnold was presented by his colleagues with a traveling bag. Dr. Joseph A. Murphy, Chief Medical and Sanitary Inspector, Public Schools of the District of Columbia, reviewed Dr. Arnold's long career in the schools and in private practice. He noted that he had examined approximately 210,560 children during 32 years in public service as a part-time employee and had ingratiated himself both with parents and pupils. One interesting incident brought out in Dr. Arnold's career by Dr. Murphy was his writing a lyric for a popular song of the World War era which had wide popularity.

Dr. A. Barklie Coulter has been appointed as Coördinator of the Bureau of Tuberculosis, Health Department of the District of Columbia, on a part-time basis at a salary of $2,800.00. This climaxes a drive made by the Committee on Public Health of the Medical Society of the District of Columbia for better coördination in the fight against tuberculosis in the District of Columbia. Dr. Coulter has been active in directing the case-finding campaign which included the taking of some 9,010 chest plates. He is a member of the Board of Consultants appointed by the Medical Society of the District of Columbia to better advise patients found suffering from the disease and who are without a family physician.

Dr. Frank Leech was extended birthday greetings on January 14, 1936, at 12:30 noon, at a luncheon attended by members of the staff and guests at Children's Hospital. It so happened that the regular staff, of which Dr. Leech has for long been chief, normally would meet in regular session at this time. The affair was arranged as a tribute to Dr. Leech, regular business suspended. Dr. Leech's table, at which were seated Drs. Joseph S. Wall, John A. Talbot, Loren B. T. Johnson, Harry A. Spigel, Chairman of the Conference; Mrs. Frederick H. Brooke, President, Board of Lady Visitors, Children's Hospital; and Mrs. Philip O. Coffin, President of the Children's Convalescent Home; was profusely decorated with flowers in the center of which was a huge birthday cake. Dr. Joseph S. Wall gave an outline of Dr. Leech's accomplishments, mentioning, in reminiscencing, the earlier days on the Hospital Staff. Notable among the remembrances was a Book of Testimonials signed by some 82 friends and associates present at the luncheon.

Dr. Wallace Mason Yater was elected a Director of the American Heart Association to serve for a term of two years, at the meeting of the Association held February 3, 1936.

Dr. Arthur C. Christie was reëlected President of the Board of Trustees of the American University.

Postgraduate Institute*

Philadelphia County Medical Society

There will be conducted an intensive and interesting study of the newer work in the field of cardiovascular and renal diseases the week of April 20–

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* The Medical Society of the District of Columbia was most active in obtaining the law providing for school inspection. Original physicians appointed as medical inspectors of schools on September 21, 1903: Drs. George H. Heitmuller, John S. Arnold, Isabel H. Lamb, John W. Mitchell, William J. Bush, Uriah J. Daniels. Of these Dr. Heitmuller is the sole representative on the active list.

* See page xi of advertising section.

24, 1936, inclusive, to be held in the Bellevue-Stratford Hotel, Philadelphia.

The program has been designed to meet the needs of all members of the profession, but particularly those in general practice. Physicians from all parts of the eastern and east-central United States are invited to attend.

Lecturers, about 30 in number, have been selected from among the foremost teachers in this great center of medical education. The medical faculties of the University of Pennsylvania, the Jefferson, Temple, and Woman's Medical Colleges of Pennsylvania are represented on the program. While approaching the subject from specialized viewpoints—those of the physiologist, cardiologist, pediatrician, surgeon, roentgenologist, bacteriologist, internist—the presentations will be a strictly practical nature, and should be of real value to the general physician, who finds cardiorenal conditions occupying a large proportion of his time.

The only charge is a $5.00 registration fee to cover the Institute's expenses. It is hoped to make the event an annual one, giving special attention each year to a different subject.

Isabel Haslup Lamb, M.D.

CAT.

1864–1936

On January 18, 1936, passed Dr. Isabel Haslup Lamb. For many years she was a practicing physician in the District of Columbia. She became an Active Member of the Medical Society of the District of Columbia on October 5, 1898, previous to her marriage to the late Dr. Daniel Smith Lamb; her status was transferred to Associate on January 3, 1923. She was born on September 16, 1864, the daughter of J. Waters and Susannah Harrison Haslup, graduating in medicine at Howard University in 1897. Both in her own right as a practitioner and as a helpmate to the late Dr. Daniel Smith Lamb, she had a distinguished career. Dr. D. S. Lamb, noted as the editor of Washington Medical Annals and his life's work as pathologist and Curator of the Army Medical Museum, died April 21, 1929.

Arthur Macdonald, A.B., A.M.

CAT.

1856–1936

Dr. Arthur MacDonald was born on July 4, 1856, in Caledonia, N. Y. He became an Associate Member of the Medical Society of the District of Columbia on January 6, 1932. His death occurred on January 17, 1936. He was graduated from the University of Rochester, A.B., in 1879; A.M., in 1883; later spending some time in the Universities of Germany and France. Dr. MacDonald was interested in anthropology and a most prolific writer. The Congressional Record has on occasion printed in full the results of his investigations dealing with physical characteristics of members of Congress.

William H. Wenger, M.D.

CAT.

1869–1936

Dr. William H. Wenger was born on August 25, 1869, in Linville, Virginia. He studied pharmacy at the University of Virginia and later was graduated in medicine from the College of Physicians and Surgeons, Baltimore, April 15, 1896. He became an Active Member of the Medical Society of the District of Columbia on November 26, 1929, transferring his membership, upon retirement from active practice, to associate on February 8, 1933. His death occurred on January 29, 1936. He is survived by two brothers, J. J. Wenger, of this city, and Isaac Wenger of Harrisonburg, Va.; a sister, Mrs. Jacob C. Geil of Harrisonburg, and a grandson.

BOOKS AND REPRINTS RECEIVED

Acknowledgment, with thanks, is made of the following:

"Cancer in the District of Columbia," by R. A. Herring, M.D., Field Representative, American Society for the Control of Cancer.

This report consists of some 171 mimeographed pages. It is replete with detail of the cancer situation in the District of Columbia. Numerous graphs and charts are shown. The deaths total, male and female, in 1910 were 300 rising to 786 in 1934, or to a rate of 158.1. Of especial interest is a chart of organization for cancer service in general hospitals. This investigation was made pursuant to the approval and coöperation of the Medical Society of the District of Columbia.

"Social Security?" by Edward H. Ochsner, B.S., M.D., F.A.C.S., Consulting Surgeon, Augustana Hospital, Chicago, Illinois.

Notable chapters: (1) "Administrative Inefficiency and Corruption." Citation of definite instances of apparent moral lapses are made. (2) In a chapter. "Medical Services Deteriorate," the differentiation between preventive medicine and the care of the sick is well stated, as follows: "The Health of the community is a community problem but the Healing of the Sick is a Very Personal Matter." "We believe that the best way to distribute the costs of medical care is to distribute the costs over a period of years for the recipient of such medical care rather than to distribute the costs so that the worker pays for the drone. . . ."

A perusal is well worth while by both physician and layman.

"The Pharmacopoeia of the United States of America, Eleventh Decennial Revision (U. S. P. XI)," received through the courtesy of the Board of Trustees of the United States Pharmacopoeial Convention.

"The National Formulary, Sixth Edition, (N. F. VI)," prepared by the Committee on National Formulary, presented by the American Pharmaceutical Association. A familiarity with this book should be the goal of each practicing physician.

"Recent Trends in Pellagra," William DeKleine, M.D., The Quarterly Review, January, 1936.

"Generalized (Therapeutic) Argyria," Leslie T. Gager, M.D., and Everett M. Ellison, M.D., International Clinics, 1935, Vol. 4, Series 45.

"The Obsessive Paraphilias (Perversions)," Ben Karpman, M.D., Archives of Neurology and Psychiatry, September, 1934.

"Preliminary to the Psychotherapy of Criminals," Ben Karpman, M.D., Journal of Criminal Law and Criminology, March–April, 1935.

"Asthenopia and Headache, Not of Ocular Origin. Differential Diagnosis," William Thornwall Davis, M.D., New Orleans Medical and Surgical Journal, September, 1935.

The fifth lecture in the Smith-Reed-Russell series for this year at the George Washington University School of Medicine was held on Tuesday, February 18, before the student body, members of the Faculty and invited guests. The guest speaker for the occasion was Dr. Esmond R. Long of the Henry Phipps Institute in Philadelphia, whose subject was "Types of Pulmonary Tuberculosis in Relation to Spread of the Disease."

CHILD HEALTH DAY—MAY DAY

The Medical Society of the District of Columbia has annually participated in the Child Health Day movement. Members have gratuitously examined children of the pre-school age at various Health Department Stations and at Parent-Teacher Association Centers. This year several committee meetings have been held which portend much for May Day, 1936. Hearty endorsement is given this fine movement which brings annually a demonstration of value to community health.

CONTAGIOUS DISEASE REPORT

January, 1936

Health Department, District of Columbia

	Morbidity	*Mortality*
Typhoid fever	12	2
Typhus fever	0	0
Smallpox	0	0
Measles	24	0
Scarlet fever	96	1
Whooping cough	16	1
Diphtheria	154	2
Influenza	14	13
Poliomyelitis	0	0
Encephalitis-Lethargica	1	1
Epidemic Cerebrospinal Meningitis	19	7
Tuberculosis (all forms)	102	53
Syphilis	303	13
Gonorrhea	259	0
Chickenpox	75	0
Chancroid	7	0
Pellagra	0	0
Pneumonia (all forms)	138	93

Medical Defense*

(From the Wisconsin Medical Journal, July, 1935)

"Members carrying medical defense who permit their dues to fall in arrears must remember that they are not entitled to medical defense if an action is commenced during the time that they are in arrears. Obviously it would be unfair to the fund and those members who depend upon it, if the fund were to permit delinquent members to send in their dues the day they discovered that a suit had been commenced. Members are not considered in arrears until the first of April—a ninety-day period of grace. . . . "

* Subject matter applicable in the District of Columbia.

MEDICAL ANNALS
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VOLUME V MARCH, 1936 NUMBER 3

PEPTIC ULCER*

CONSIDERATIONS OF THE ETIOLOGY AND SURGICAL TREATMENT

J. TATE MASON, M.D.
Seattle

I have had the opportunity of observing a number of my patients with a clinical diagnosis of peptic ulcer over a period of a quarter of a century. Some years ago Dwyer and Blackford in a series of several thousand patients who complained of gastric symptoms found that only 1 out of 7 had a final clinical diagnosis of organic gastric disease, and that peptic ulcer was next in frequency, in upper abdominal lesions, to gallbladder disease, which was 1 in 5.

THEORIES OF THE ETIOLOGY OF PEPTIC ULCER

The probable cause of peptic ulcer has been a fascinating study. We wonder why men have this trouble more frequently than women; why duodenal ulcer usually begins between the ages of 20 and 30 and gastric ulcer between 30 and 40; why in duodenal ulcer we do not find cancer, while in gastric ulceration cancer is two thirds as frequent as a benign lesion. As the years have gone by, our lack of accurate information has resulted in many changes of opinion as to the etiology. In my early days we thought that there was first some disturbance of a terminal blood vessel (thrombosis, embolism, endarteritis) of the mucosa, which was immediately followed by local anemia, a lowered resistance of the mucous membrane, and acute ulceration; and that the continuous action of the acid gastric chyme finally caused the chronic localized ulceration. A study of the blood supply of the duodenum and the stomach made by Reeves 15 years ago again substantiated Virchow's original suggestion, which was that if the blood in one of the vessels of the duodenum or stomach became attenuated or the lumen occluded a localized area of anemia occurred, with danger of ulceration. The less abundant vascularization of the lesser curvature of the stomach and the pylorus, and particularly its upper side, and of the first portion of the duodenum has been called to our attention by Dr. William J. Mayo. The introduction of dilute solutions of formaldehyde into a gastric blood vessel will invariably result in localized ulceration, sometimes chronic, and occasionally in perforation. As late as 1927 the cause of ulcer was suggested by Gallagher to be of this nature in that he was able to produce acute ulcers in the duodenum by rendering the localized areas anemic for 30 minutes by means of clamping the mucosa.

Following the vascular theory of peptic ulcer came the theory of trauma or some mechanical disturbance (Aschoff). The advocates of this idea believed that particles of food traumatized the mucous membrane and so lowered its resistance that ulceration occurred, and that this became chronic because of the presence of the acid secretion in which it was continually bathed.

Almost immediately on the heels of these advocates came those who felt that the constitutional factors of the individual, that is his general make-up, deserved the most weighty consideration. We do know that many people with peptic ulcer show an unstable emotional state, that they are highly irritating to themselves and occasionally to their friends, and that of all the probable causes this condition must be of some importance.

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* Read before the Society, November 22, 1935.

Then followed the well-known and most excellent investigation of Rosenow, in which he showed that certain strains of bacteria found in peptic ulcer were practically always found at the same time in other localized areas of infection in the body. We began to forget and discard our older theories. During this time minute attention was paid to focal infections in the teeth, tonsils, nares, gastro-intestinal tract, etc. Many a tooth was pulled unnecessarily, colons were irrigated, prostates massaged, etc., beyond all reason.

The various hypotheses as to the etiology of peptic ulcer are so numerous that they cannot all be mentioned. Vascular occlusion, trauma, the resistance of the mucous membrane to the acid gastric chyme, combined with systemic conditions, possibly play an important rôle. Von Bergmann as far back as 1913 considered that derangement of the nervous system was one of the most significant factors in the causation of peptic ulcer. In 1932, Cushing suggested that "those favorably disposed toward the neurogenic conception of ulcer have in the process of time gradually shifted the burden of responsibility from the peripheral vagus to its center in the medulla" and later to higher centers. It was stated that "these centers were newly recognized as a highly important, long overlooked station for vegetative impulses easily affected by psychic influences." In conclusion, he stated that this conception of the etiology of ulcer did not account for all ulcerative processes or conditions but did offer a reasonable explanation of the majority of them.

Ulcers have been produced experimentally in a multiplicity of ways. However, when we have any condition, either experimentally or otherwise, in which the duodenal contents are prevented from mixing freely with the acid gastric chyme in the stomach, ulcer occurs. In other words, if acid chyme is allowed to flow uninterruptedly in any part of the gastro-intestinal tract, we invariably find a high percentage of individuals in whom ulcer occurs.

A high percentage of acid in the gastric secretion is an outstanding condition in patients with peptic ulcer. Whatever the causes of ulcer may be, one must conclude that the chronicity of these ulcers is the result of this hyperacidity. The question arises, then, as to what causes hyperacidity.

It is a well-established fact that animals with completely denervated stomachs continue to have gastric motility and a flow of gastric juice after a meal of meat and the injection of histamine. But motion is distinctly slower, and the secretion is not nearly so abundant as before denervation. This result can only be interpreted as showing that the stomach has a high degree of automaticity in its motor as well as in its secretory functions. This might lead us to believe that the neurogenic theory cannot be the entire underlying cause of gastroduodenal ulceration in all patients. We are inclined to believe, however, that it is a very important factor. It is quite possible that some individuals have a highly sensitive nervous system which receives psychic impulses much more rapidly than does the nervous system of other individuals. These stimulating influences in all probability may be received in many different ways, the special senses no doubt playing an important rôle. These in turn stimulate the production of hormones, and they in turn set up activity in the midbrain, which in its turn sends impulses to the vagus, with the result that we have a hypersecretion. With the hypersecretion there is immediately a peristaltic activity with pylorospasm. Here we have a field for ulceration, which may continue for a long time, waiting for some such exciting cause as has been suggested, as occlusion of a blood vessel, trauma, infection, and what-not.

Now that, for the sake of argument, we have traced the stimulation from, we will say, some psychic influence, is it not highly probable that the stimulation may occur at the other end of the line; that is, some unusual local irritation of the stomach, which immediately causes a flow of gastric juice, increased peristalsis, and pylorospasm, and that this may also be an important factor among the many possible causes of ulcer? I am inclined to believe that this type of ulcer has a tendency to heal spontaneously and usually stay healed indefinitely. My own experience coincides closely with that of Emery and Monroe.

Certainly more factors seem to be involved in those local lesions in the mucous membrane which often heal spontaneously and then break down again. This chronicity has a tendency to persist throughout life when once established. Except in the case of perforation, occasionally of hemorrhage, and in a small operative mortality, peptic ulcers are very rarely fatal. Aside from occasional variation they do not seem to increase in severity as time goes on.

TREATMENT OF PEPTIC ULCER

The type of treatment, either surgical or medical, which will give the longest period of freedom from symptoms, is the one which will definitely lower the degree of acidity of the gastric chyme. Surgical procedures result in a greater number of periods of successful remission and cures than does a medical régime, but operations do carry a small but definite percentage of casualties in the hands of the average surgeon. Under a medical régime, the majority of patients with peptic ulcer, while not usually cured, will become symptom-free. No patient with peptic ulcer should have surgical interference unless there is a complication which does not respond to medical treatment. One of the greatest advances in the treatment of peptic ulcer is the realization that this condition should not be summarily classified as either a medical or a surgical disease exclusively. Gastric lesions are usually easily diagnosed as cancer or ulcer, but there is a small percentage of patients in whom it is difficult to determine whether the lesion is a malignancy or a benign ulcer. This problem should be solved by early operation in case the roentgenologic findings do not show a change for the better and the patient does not show symptomatic improvement after 4 to 6 weeks of medical treatment. The well-known complications which necessitate surgery are perforation or impending perforation, pyloric obstruction, repeated hemorrhages that seem to endanger the life of the patient, intractable chronicity, and intolerance for alkalis. There are also a few patients who are advised to undergo surgery for the reason that they cannot, because of their occupation or because of living in some isolated part of the country, carry out any dietetic control.

There is some difference of opinion as to when and when not to operate upon a bleeding ulcer. We classify our bleeding ulcers into two groups. First are those that bleed at a time when the patient is having no symptoms whatsoever from his ulcer. The second are those that bleed during the time the patient is having exacerbations of symptoms to a severe degree. The first class of patients are those with a healed ulcer which begins to ooze because of trauma from food or otherwise to a mucous membrane healed over the scar tissue base of the ulcer. These hemorrhages may be severe but practically never severe enough to warrant operative interference. In the second class are those patients in whom there is an actively spreading inflammation and erosion in the ulcerating area, and if a fair-sized artery has been eroded in the base of one of these ulcerations these people will become moribund if not operated on shortly. This observation has given us a sense of security which we did not have until this distinction had been noted in a number of patients.

In other words, we have found that two thirds or more of patients with hemorrhage from ulcer admitted to the hospital have bleeding in a quiescent period, and we are not seriously disturbed about mortality risk in such patients. Less than one third are admitted with bleeding during a period of active symptoms. Of this one third, a certain fraction, possibly 15 per cent, includes the mortality of hemorrhage from bleeding ulcer. It is this group which we believe can be picked out as proper for operation as a life-saving measure. If a patient with active ulcer symptoms has massive hemorrhage and continues to bleed, then we have an indication for surgery. Probably in 5 per cent of patients with active bleeding surgery is indicated.

If only an excision is performed, secondary operations are usually necessary.

TYPE OF OPERATION

If we agree that only patients with complications of peptic ulcer or with unusual conditions surrounding their mode of living which make surgery advisable should receive surgical treatment, we are confronted with the problem of what type of operation to do. It should be realized that regardless of what operation the surgeon may favor he should not apply it in all cases. Certainly with greater experience one is better able to decide what procedure is best to meet the requirements in each individual case. There was a time in my earlier experience when gastro-enterostomy was the operation of choice in practically all of these lesions. As time has gone on I have come to use it less frequently, but I still feel that when properly selected it gives a satisfactory result.

The Devine operation and infrapapillary gastroduodenostomy with retromesenteric displacement of the duodenum and jejunum by Rienhoff impressed me, but up to the present time I have not had occasion to do either type. I have felt that the first object of any operation for peptic ulcer was to remove the ulcerating area if possible. My next consideration has to do with the reflux of the duodenal content. In the normal stomach just after digestion the pylorus opens and a reflux of duodenal content occurs in the stomach, which reduces the acidity of the gastric juice. I have felt that approximately four fifths of all gastric symptoms are from some derangement of the motor apparatus, such as pylorospasm or unusual activity along the lesser curvature beginning about midway between the cardiac end and the pylorus. In the past 10 years in each operation that I have done I have removed if possible all of the ulcerated area and made the opening between the stomach and the viscus to which it is to be anastomosed large enough to allow a free flow of duodenal content into the stomach during its quiescent periods. Upon this point depends the difference between failure and success.

Posterior Gastro-enterostomy.—The first and most popular operation with me has been a posterior gastro-enterostomy. My immediate hospital deaths from all causes have been approximately 4 per cent. Gastrojejunal ulcers occur in 8 per cent. There are some who probably did not return to me for treatment or who refused to communicate concerning their postoperative condition, but I am satisfied that this percentage does not run over 10 per cent. Eighty-five per cent of my patients who are living who have had gastro-enterostomies are happy and satisfied, although there are a small percentage of these who occasionally have some degree of gastro-intestinal upset. I feel not only that gastro-enterostomy is a mechanical operation in which the gastric content is diverted from the area that is having or has had an ulceration, but also that it has a physiological effect on the gastric function probably close to that of a normal stomach in which the pylorus empties and allows the duodenal content to empty into it during times of quiescence. I feel that the larger the stoma is in the stomach the better will be the function of the gastro-enterostomy.

Gastro-enterostomy continues to be the useful operation for the treatment of duodenal ulcer, especially for those patients in whom symptoms of obstruction have developed. In ulcer high up on the cardia, if resection of the stomach is inadvisable or impossible, I have found that gastro-enterostomy was particularly satisfactory for older patients and for those debilitated from ill health in whom otherwise a resection would have been performed. That gastro-enterostomy is still a very useful operation is shown in a report by Judd and Waldron of 2,303 patients receiving attention for duodenal ulcer in the past 5 years at the Mayo Clinic. Of these, 1,472 underwent only a gastrojejunostomy and 663 had local operations. Less than

5 per cent were subjected to the radical procedure of partial gastrectomy.

Pulling the jejunum through a separation in the gastrocolic omentum during the time the anastomosis is being made to the stomach simplifies the technic greatly; particularly has this been true in short obese individuals.

Excision and Pyloroplasty.—In my early experience with duodenal ulcer I had occasion to try the operations of Horsley, Finney, and Mikulicz, but I have finally given them up except in a modified form. Since the introduction of Judd's pyloroplasty it has been the operation of choice, somewhat modified to suit my ideas of a pyloroplasty. This has replaced extensive resections, which may have given a higher mortality rate. I have, therefore, performed this type of pyloroplasty for the past 10 years when it was possible to remove the ulcer around the pylorus. In 50 cases my mortality has been nil. The immediate postoperative results are perfect. There has been a group of patients, possibly 40 per cent, who have not had complete and satisfactory relief. Recently I have had occasion to bring a number of these patients in for examination. I am of the opinion that either I did not perform the operation perfectly or that some change in technic was necessary. So, in my last series of 10 cases, I have modified the Judd pyloroplasty by including some of the Finney technic. This gives a much larger outlet between the stomach and the duodenum. This was resorted to because in practically all of these patients who have had disturbances I have found a rather small outlet to the stomach. A deformed cap is always present following a pyloroplasty. A side-and-end anastomosis of the duodenum is made to the end of the stomach. This gives a large stoma, which in my experience is a most satisfactory operation.

Pyloroplasty and Gastric Resection.—I have not performed this operation for duodenal ulcer but have reserved it for the large ulcer on the lesser curvature, and in these cases, after excision, possibly one third to one half of the stomach has been removed transversely. While my series has been small compared with those of other clinics, a follow-up of these patients has been most satisfactory. However, I do feel that any operation that carries with it a mortality of approximately 10 to 12 per cent should be avoided if surgical procedures of lesser extent give nearly as satisfactory results. Whether a Billroth No. I or No. II or some modification of a Polya is to be selected, I think depends entirely upon the individual patient. Some stomachs will adapt themselves easily to any one of these three, while others will be of such a nature that they will make one or the other a most difficult operation. The suggestion of Lahey that the ligament of Treitz be severed and the proximal jejunum with the last portion of the duodenum be allowed to fall above the transverse mesentery of the colon has been most satisfactory. In posterior resection of the stomach I lost 2 patients because of constriction with some infection where the proximal and distal loops came through the transverse mesocolon. So little stomach had been left that it was impossible to attach it to the transverse mesocolon.

In conclusion, I have felt that inasmuch as peptic ulcer is a disease which has a tendency to recur no matter what surgical procedure is carried out, it is advisable if possible to remove the lesion and then carry out the simplest surgical procedure that will allow that stomach to have a large outlet and give a chance for the regurgitation of the duodenal content into it from time to time. With my present experience I feel that no particular operation should be the one operation of choice in all kinds of peptic ulcer. Gastro-enterostomy continues to have a great place in gastric surgery. Every surgeon should master the different types of anastomosis. Physiologically a no-loop gastro-enterostomy is the best. When one makes a no-loop gastro-enterostomy and then has some complication, he has a most embarrassing situation when he attempts to disconnect the opening. Pyloroplasty plays an important rôle, and I feel that with the realization that the complications following this procedure are due to constriction, better results can be obtained. I now rely upon a modification of a Finney and a Judd technic, and the ultimate results have been satisfactory. As time goes on and the mortality of gastric resection can be lowered in the average surgeon's hands, it should be used more frequently than it is at the present time because the final results are better, although on the other hand the mortality is much higher.

BIBLIOGRAPHY

Cushing, H.: Peptic Ulcers and the Interbrain. Surg., Gynec. & Obst., 1932, 55, 1.

Dwyer, M. F., and Blackford, J. M.: Interpretation of Gastric Symptoms; A Clinical and Roentgenological Study of 3,000 Cases. Radiology, 1930, 14, 38.

Emery, E. S., Jr., and Monroe, R. T.: Peptic Ulcer; Nature and Treatment Based on a Study of 1,435 Cases. Arch. Int. Med., 1935, 55, 271.

Judd, E. S., and Waldron, G. W.: Conservative Surgical Treatment of Ulcer of the Stomach and Duodenum. Am. J. Digest. Dis. & Nutrition, 1934, 1, 262.

JAUNDICE*

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Jaundice is the yellowish discoloration of tissues caused by an abnormally high concentration of bile pigment in the body fluids. Clinically and historically its etiology has been based on liver and bile tract disease. More recently, however, with the advent into medical conception of pathological physiology jaundice is seen to represent an abnormality of pigment metabolism.

Origin of Bile Pigment

Bile pigment originates from blood pigment and blood pigment resides in hemoglobin. Hemoglobin is a union of heme and of globin. The globin is a non-pigment protein radical while heme itself is a basic pigment complex, chemically an iron porphyrin compound. In a purely schematic way blood pigment metabolism assumes the following cycle. Iron associates itself with suitable porphyrin radicals to produce heme, the basic pigment complex as mentioned above. Heme then combines with globin to produce blood hemoglobin; blood hemoglobin upon hydrolysis yields hematin plus iron. Hematin is further hydrolized into bilirubin. Bilirubin upon reduction becomes urobilinogen. Urobilinogen by oxidation produces urobilin. This last step, the conversion of bilirubin to urobilinogen and urobilin is accomplished only after bilirubin has passed as a bile constituent into the gastro-intestinal canal.

Bile pigment chemically is bilirubin and is formed by the breaking down of the hemoglobin of the red blood cells. This fragmentation or phagocytosis of red cells and the formation of bilirubin is accomplished in all parts of the body by the cells of the reticulo-endothelial system. Bile pigment formation, therefore, is not exclusively a liver function. However, the reticulo-endothelial system is concentrated primarily in the bone marrow, spleen and liver, and it is, therefore, in these areas that the breaking down of reticulocytes and the formation of bile pigment chiefly occur.

Normally pigment metabolism is an orderly and well balanced mechanism whereby the amount of blood pigment is kept carefully within certain fixed limits. This balance is maintained by two factors: the rate of pigment formation within the living organism and the rate of pigment elimination from the body. Pigment formation has just been discussed. Pigment elimination is accomplished by the liver and kidneys and excreted in the bile and urine. Practically all pigment is excreted normally by the liver through bile, but definite traces are constantly eliminated in the urine.

With this short background it is readily seen that jaundice is a disturbance in this blood pigment balance, whereby there is an excessive accumulation of pigment in the blood, termed hyperbilirubinemia. This accumulation may be due to an excessive production of pigment within the body on the one hand or to a diminished excretion from the body on the other; or it may be a combination of both.

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This brings us to the mechanism of jaundice from the clinical standpoint. Jaundice results either from too rapid and too great blood destruction with the formation of pigment beyond the amount that can be eliminated; or from an interference with the liver and bile duct excretory system which is unable to eliminate the pigment normally formed. Not infrequently both factors are active simultaneously.

From a clinical standpoint jaundice is generally classified into hemolytic, toxic and obstructive types according to the principal mechanism involved. Hemolytic jaundice results from an excessive blood destruction alone without, primarily at least, any disturbance of the liver excretory system. Toxic jaundice results from impairment of pigment exchange from blood to bile by direct damage to the liver parenchyma itself. Obstructive jaundice results from obstruction to the free flow of bile from liver to intestine.

HEMOLYTIC JAUNDICE

Hemolytic jaundice is a general term used to apply to all forms of jaundice due to extrahepatic causes. This would include familial hemolytic jaundice, acquired hemolytic jaundice, pernicious anemia, paroxysmal hemoglobinuria, incompatible blood transfusions, sickle cell anemia, phenylhydrazine poisoning, grave familial jaundice of the newly born, epidemic hemoglobinuria of the newly born (or Winkle's Disease) and probably most cases of icterus neonatorum. However, as ordinarily used hemolytic jaundice designates a disease entity with certain characteristic features. These are a long-standing non-obstructive jaundice, splenomegaly, anemia with microcytosis, a decrease in the resistance of the red blood cells to hypotonic salt solution (increased fragility), a high percentage of reticulocytes and a tendency to familial occurrence of the disease.

Many synonyms are used and include such descriptive names as chronic familial jaundice, hemolytic splenomegaly, hemolytic anemia, chronic infectious jaundice with splenomegaly, and chronic acholuric jaundice.

The diagnosis of hemolytic jaundice is usually not difficult. A history of long-standing jaundice, non-obstructive in type, the jaundice usually noted at or soon after birth although in the acquired type jaundice may not be noted until later in life, enlargement of the spleen and typical blood findings all make a positive diagnosis possible. The icterus once established usually persists throughout life. It is characteristically a dissociated jaundice, i.e., there is an accumulation in the blood and tissues of bile pigment without any retention of bile salts. For this reason the symptoms, pruritis and bradycardia, which are due to an excess of bile salts and which are so common in obstructive jaundice, are absent in this disease. The icterus is ordinarily not marked; indeed, it may be so slight as to be noted only upon careful examination. There is a definite tendency for the jaundice to vary in intensity. During the so-called crises of the disease, it may become very deep. At other times it becomes more intense following chilling, digestive disturbances or emotional strain. The stools are usually deeply pigmented and are never clay colored. On the contrary, the large amounts of bilirubin excreted into the bowel and the excessive urobilinogen formed from it is a notable diagnostic point.

Examination of the serum in hemolytic jaundice shows a definite increase in its bilirubin content. This, however, is almost never so great as in cases of obstructive jaundice, and except in severe exacerbation is usually less than 5 mg. per cent (normal range, 0.1 to 0.5 mg. per cent). The degree of jaundice is not entirely dependent upon the rate of blood destruction and resultant bilirubin formation alone, but also upon the excretory ability of the liver. It has recently been pointed out, especially by Rich, that the anoxemia resulting from the associated anemia induces a partial suppression of liver function, diminishing its capacity to remove bilirubin from the blood. The van den Bergh reaction is indirect or very markedly delayed. Despite the great over-production of bilirubin in the blood none appears in the urine. On the other hand, with the large amounts of bilirubin available in the intestines there is a conversion into an abnormally large amount of urobilinogen, which in turn is absorbed from the intestines into the blood stream. Being in excess apparently of the amount the liver is capable of reconverting, urobilinogen is eliminated by the kidneys and the urobilinogen content of the urine is greatly increased.

In hemolytic jaundice liver function tests are all quite normal. Galactose and levulose tolerance tests show no disturbance of the carbohydrate metabolic function. Dye excretion, as demonstrated by the bromsulphalein and other dye tests, is normal. This absence of dye retention is of diagnostic value, since in jaundice, other than the hemolytic type, there is almost always some degree of liver insufficiency as shown either by the dye or the sugar tests. Blood cholesterol is not increased in hemolytic jaundice. This is in contradistinction to the increased values found in obstructive jaundice.

Splenomegaly is one of the most constant features of a typical case of hemolytic jaundice. The size of the spleen is roughly proportionate to the duration and severity of the anemia and jaundice. In mild cases it may be barely palpable; in more severe instances the spleen may be tremendously enlarged, and some of the largest spleens on record have been found in hemolytic jaundice. Sudden splenic enlargement often with severe pain is particularly apt to occur during an exacerbation of the disease. The liver may be slightly enlarged during exacerbations but is generally normal in size.

The blood picture is of particular interest and diagnostic value. It is marked by a proportionate decrease in red cells and hemoglobin with the color index remaining close to 1. Examination of stained films shows in particular a definite microcytosis which is said to be associated with no other type of jaundice. At the same time the number of reticulocytes is greatly increased, commonly forming from 10 to 20 per cent of the red cells, and there are cases reported in which 92 to 95 per cent of the red cells are reticulocytes. Their number is an indication of blood-forming activity and fluctuates in proportion to the degree of the activity of the disease. There is also a definitely increased red blood-cell fragility, these cells showing a definite and characteristic lack of resistance to hypotonic salt solution. Fragility, however, may be normal in otherwise typical cases of hemolytic jaundice. Gänsslen states that 10 per cent of the cases do not show increased fragility.

It is important in this connection to realize that many patients show incomplete forms of the disease. Again, Gänsslen states that anemia is absent in 35 per cent of the cases. Jaundice is absent in 40 per cent and splenomegaly in 30 per cent. While it is probable that if all these cases could be carefully followed throughout their entire course they would present more typical findings, Gänsslen's observations are important in stressing the necessity for making the diagnosis in this disease even when some of the more usual findings are absent. Such atypical cases are more frequently found in families which contain fully developed cases of hemolytic jaundice.

The course of hemolytic jaundice is essentially chronic, and especially in those cases which begin early in life is often quite mild. In many instances these patients are not incapacitated and the disease rarely causes death. The course, however, is frequently marked by sudden increases in the severity of the disease. These exacerbations are called crises. There occurs a sudden rise in temperature and increase in the jaundice, the spleen becomes larger and more tender, and the anemia much more marked. These crises tend to occur with more frequency early in life and gradually disappear as the patient gets older. They usually subside spontaneously, and recovery from them is fairly rapid. The chief complication of hemolytic jaundice is cholelithiasis, which is extremely frequent, occurring in from 30 to 58 per cent of cases according to different series.

The explanation for this high incidence of gall stones is thought to lie in the excretion of bile which contains such a high concentration of bilirubin.

The treatment of hemolytic jaundice is in general quite unsatisfactory. The milder cases require little or no treatment. The remainder are carried along by ordinary medical measures as long as possible. In severe cases splenectomy has been resorted to and is the only direct treatment which apparently affords relief in the large majority of cases. There is difference of opinion as to whether splenectomy should be done quite early or late. Most authors seem conservative on this point and refrain from the procedure so long as the patient is not incapacitated by his disease. The operation should never be performed during a crisis.

Toxic Jaundice

Toxic jaundice results from direct injury to the liver parenchyma. This is also known as hepatotoxic jaundice or hepatocellular jaundice, and in McNee's classification the two types of toxic and obstructive jaundice are grouped together under one heading of regurgitation jaundice. In McNee's classification hemolytic jaundice is classified as retention jaundice; while there are many good grounds for this classification the accepted and the most valuable classification from a clinical standpoint is hemolytic, toxic and obstructive.

In extensive liver injury on account of the extremely acute and overwhelming onslaught, acute hepatic functional insufficiency develops. This liver injury may result from a variety of causes: chemical or vegetable poisons, bacterial or virus poisons, protozoal poisons and a miscellaneous group. It will be of interest to merely mention the various headings under these main divisions of liver poisons. Under chemical poisons there are:

1. Arsenobenzol derivatives: arsphenamine, neoarsphenamine, tryparsamide, etc.
2. Quinoline derivatives: cinchophen, atophan quinophen, phenoquin, acophanyl, hydrocin, oxyl iodide, arcanol, etc.
3. Halogen group: chloroform, carbon tetrachloride, tetrachlorethane, ethyl chloride, ethyl bromide, trichlorethylene, tribromethyl alcohol (avertin).
4. Aromatic organic compounds: trinitrotoluene (T.N.T.), dinitrobenzedine, dinitrophenol, picric acid, toluylenediamine and acriflavine.
5. Miscellaneous: arseniureted hydrogen, phosphorus, alcohol, lead, mercury, synthaline, snake venom.

The only vegetable poison of note is that of mushrooms.

Under the heading of bacterial or virus poisonings is included cases of epidemic catarrhal jaundice (infectious jaundice), pneumonia, yellow fever, influenza, food poisoning, typhoid fever, paratyphoid fever, typhus fever, parenteric fevers and streptococcus septicemia.

Under protozoal poisons are syphilis (as icterus syphiliticus praecox and specific chronic interstitial hepatitis), spirochetosis ictero hemorrhagica, amebic dysentery, malaria, kala-azar and relapsing fever.

Under the miscellaneous group are included idiopathic non-epidemic catarrhal jaundice (some types), toxemias of pregnancy, uremia, goiter, acidosis of recurrent vomiting in children and portal cirrhosis.

Some of these causes of toxic jaundice are also capable of inducing a concomitant hemolysis which may be partly responsible for the icterus. However, the primary pathogenesis is considered to be that of a true hepatitis.

In acute, extensive liver injury, symptoms of malaise, epigastric pain and tenderness, nausea and vomiting develop rapidly, and as liver function becomes more and more insufficient there develops intense jaundice, hemorrhages from the gastro-intestinal tract, renal insufficiency, bradycardia, stupor, coma and death. The blood in such cases shows a mounting quantity of bile constituents, bilirubin increasing with at first a delayed direct or indirect but later a direct van den Bergh; bile salts appear in the blood and urine; cholesterol occurs in normal or slightly elevated quantities at first, but as actual liver necrosis and insufficiency develop cholesterol values are normal or even below normal. Urobilinogen is greatly increased in the urine until the terminal stage, when there is complete suppression of liver function with absence of bile pigment in the intestine and of urobilinogen in the urine.

The treatment of toxic jaundice is, of course, the removal of the cause, if and when possible, plus general supportive care indicated in the medical treatment of all cases of definite hepatic disease. Briefly, this medical care may be stated as follows: During the acute stage the functional integrity of the liver should be protected insofar as possible by such general measures as bed rest; fever control; the insuring of adequate water intake; the administration of easily assimilable food, chiefly carbohydrates or glucose in adequate amount; in the more acute stages intravenous and subcutaneous solutions of normal saline, glucose and often calcium, as well as other so-called vital electrolytes, potassium, magnesium, etc. Fats are eliminated as completely as practical when little or no bile is entering the intestinal tract, otherwise animal fats in small quantities are permissible. Proteins are limited somewhat and should be prepared in as readily an assimilable form as possible. It is important, however, to maintain as adequate a diet as possible. Blood transfusions are occasionally of striking benefit. The recognition and if possible the elimination of the liver-toxic substance is, of course, always to be a primary effort.

Little additional need be said concerning toxic jaundice. It is, however, of interest and of some practical importance to note that certain factors materially increase the susceptibility of liver to injury. Of the conditions which are now known to render the liver more prone to injury, perhaps the most important is a marked depletion in the glycogen reserve of the liver. This diminution in hepatic cell glycogen may result from prolonged carbohydrate deprivation or excessive utilization of carbohydrates accompanying the increased metabolism of hyperthyroid states and fever. Thus, the variable susceptibility to the development of hepatitis following the use of such hepatotoxic substances as the arsenicals or cinchophen may be largely dependent upon the amount of glycogen stored within the liver at the time of their administration. In a similar way lack of circulating blood oxygen, anoxemia, secondary to congestive heart failure and severe anemia is another factor which may predispose to the occurrence of acute hepatitis. Resnik and Keefer demonstrated that dogs subjected to anoxemia were easily jaundiced by carbon tetrachloride. Barron and Rich showed that dogs kept under reduced oxygen tension were unable to excrete bilirubin normally. And Rich has also pointed out that anoxemia can produce definite liver toxic changes in the form of actual cell necrosis.

OBSTRUCTIVE JAUNDICE

The third type, obstructive jaundice, is the most common and the best known. Approximately 80 per cent of all cases of jaundice are of this obstructive type. Any condition which blocks the normal free flow of bile from liver to the duodenum may produce obstructive jaundice. Obstruction may be within the lumen of the bile ducts, as gall stones, parasites, pedunculated tumor, foreign body, edema in some types of catarrhal jaundice and other inflammatory processes of the lining mucosa. Even spasm of the sphincter of Oddi may account for transient obstructive jaundice. To this cause is ascribed the phenomenon of "hysterical or nervous" jaundice. Changes in the walls of the duct such as strictures resulting from inflammatory lesions or tumors arising from the duct wall itself may also produce obstructive jaundice. Likewise, pressure on the bile ducts from without may cause jaundice of this type. Typical of such causes are pancreatic tumors and cysts; duodenal ulcer or tumor; cancer, cyst, abscess or gumma of the liver itself; enlarged glands (malignant, inflammatory, luetic or tuberculous); adhesions involving liver, gallbladder, duodenum, stomach, etc.; tumors of the stomach, kidneys, retroperitoneal structures, uterus, etc.; and even angulation produced by extreme ptosis.

Obstructive jaundice is characterized by an abnormal accumulation in the blood of all of the biliary constituents, bile pigment, bile salts, bile acids, cholesterol, and the various nitrogenous waste products normally excreted through the biliary system. Thus, in the clinical consideration of obstructive jaundice, toxic symptoms develop to a marked degree because of the introduction of toxic biliary constituents into the blood stream and because of an increasing hepatic insufficiency.

Bilirubin in the form of direct-reacting bile pigment, as determined by the van den Bergh test, and bile salts appear in the blood serum and urine, and the tissues become intensely stained by bile pigment. The exclusion of bile from the intestinal tract plays an important rôle in the symptomatology in biliary obstruction. It stops the secretion of bile by the liver which is dependent upon a reabsorption of bile salts from the intestine. It thus interferes drastically with motor, secretory and digestive functions. Its absence seems to remove an additional vital factor as well. Dogs with complete biliary obstruction generally die within 3 months, although survival up to 6 or 7 months may occur when animals are restricted to a milk diet. In man, complete obstruction is usually fatal in 6 months, osteoporosis of bones, anemia, hemorrhages and disturbances of nutrition being prominent signs. The particular factor in bile which plays such an important rôle is not known.

Prolonged biliary stasis leads gradually to necrosis of the liver parenchyma. This again brings to mind the close relationship existing between toxic jaundice, with much of its symptomatology based on obstruction, and obstructive jaundice, with much of its harmful effects due to liver-cell destruction. Renal changes suggesting a terminal nephritis occur in clinical cases of obstructive jaundice and may be shown to follow experimental occlusion as well. Anemia, a terminal rise of blood urea and albuminuria, are common complications during late stages of biliary obstruction. The amount of bile secreted daily is estimated as half the total volume of urine. Thus, suppression of bile excretion inevitably creates marked disturbances in water balance, blood pH, and the metabolism of calcium, sodium and the other electrolytes.

To return to the symptomatology in obstructive jaundice, the stools become clay colored, the urine contains large quantities of bilirubin and is deep yellow or dark brown. Tests for bile salts in the urine are positive. If the obstruction is complete urobilinogen will be absent in the urine, but in incomplete obstruction it will not only be present but usually in abnormal quantities. Blood cholesterol is increased in complete obstruction, while in incomplete obstruction it may be slightly increased or normal.

In cases of complete obstruction, symptoms of cholemia appear, such as marked jaundice, bradycardia, severe skin itching, wasting, general malaise, somnolence, coma and death. A hemorrhagic state said to result from the presence of bile salts in the general circulation, or from the interference in fibrinogen formation by the liver, may develop. Widespread hemorrhages into the skin, subcutaneous tissues, muscles or parenchymatous organs, hemoglobinemia and hemoglobinuria may result.

In incomplete obstruction, when small amounts of bile seep into the intestinal tract, many of these symptoms of true cholemia fail to appear, even in the presence of obvious, and often intense, general pigmentation. In incomplete obstruction there results a direct reaction to the van den Bergh test from the hyperbilirubinemia. Bilirubin and bile salts appear in the urine together with urobilinogen, the latter usually in increased amounts. The stools are not clay colored, but a quantitative estimate shows a definite lack of stool pigment. A decreased fragility of the erythrocytes is often present.

DIAGNOSIS

From a diagnostic standpoint our chief concern is the differentiation of obstructive from the other types of jaundice. The treatment of obstructive jaundice calls for early surgical interference, while treatment of the other types is primarily medical.

Typical cases of jaundice of the various types are usually readily recognized. The history in hemolytic jaundice, with marked chronicity, great familial tendencies, splenomegaly and the characteristic blood findings of a microcytic anemia with increased reticulocytes and increased red blood-cell fragility, plus normal findings in functional tests of the liver, make a positive diagnosis. A careful history into the onset of toxic jaundice may disclose the etiologic factor. Arsphenamine or similar hepatotoxic medication, a positive blood Wassermann, or a history of an acute infectious disease is usually obtained. Likewise, in typical cases of obstructive jaundice the most frequent causes are common-duct stone, carcinoma at the head of the pancreas, so-called catarrhal jaundice and chronic pancreatitis. With complete or nearly complete obstruction the intense icterus, absence of bile in the duodenum, acholic stools, bilirubin and bile acids in the urine, plus a suggestive past history constitute the essential criteria, and a correct diagnosis usually ensues. On the other hand, greatest difficulty is frequently experienced in differentiating obstructive jaundice, particularly if it is not complete, from toxic or hepatocellular jaundice.

From the standpoint of the history, idiopathic acute (toxic) hepatitis is more common in childhood or young adult life. A history of antecedent respiratory infection is frequent. The history of exposure to known hepatocellular toxin as mentioned above, the presence of pregnancy, history of recent chancre, or the presence of any condition which is known to affect liver function (goiter, carbohydrate deprivation, anoxemia, chronic profuse hepatic disease) favors the probability of a hepatitis. A previous history of biliary colic or chronic dyspepsia (suggesting cholelithiasis), great loss of weight and strength (suggesting carcinoma), of diabetes (with chronic pancreatitis or pancreatic carcinoma), or of previous gall tract surgery (suggesting duct constriction), favors the likelihood of an obstructive type of icterus.

In the symptomatology, itching and hemorrhages are more common in obstructive jaundice. One of the most frequent causes of obstructive icterus, common-duct stone, usually causes pain. However, mechanical obstructive jaundice is not infrequently painless. Pancreatic and bile-duct malignancy usually do not cause pain until late in their course, and even icterus due to stone in the common duct may be unassociated with pain. However, the mechanical types of obstructive jaundice requiring surgical treatment are more prone to occur in middle life or later. Painless jaundice occurring in youth is most often due to hepatitis or so-called catarrhal jaundice. Even with acute hepatitis pain may be present, but it is usually not severe or of long duration.

On physical examination, splenomegaly in association with jaundice of short duration in the absence of a history of chronic liver disease strongly favors the diagnosis of acute hepatitis. The liver may be slightly enlarged in either type.

Laboratory examinations provide many helpful criteria. Bockus and Tumen believe that the galactose tolerance test is positive only in cases of acute hepatitis. They feel that a positive test is practically pathognomonic of acute hepatitis, while a repeatedly negative test if performed early in the course of the disease favors a diagnosis of obstructive jaundice. The van den Bergh, the urobilinogen and the dye tests all are of little use in differentiating these difficult cases of acute hepatitis resulting in toxic jaundice from cases of incomplete obstructive jaundice. These tests are of value, however, in establishing the amount of liver damage after the acute phase has been passed. Blood cholesterol determinations may be of value. In cases of obstructive jaundice cholesterol is present in the circulating blood in increased amounts, if the obstruction is complete. It may not be much increased, however, in cases of partial obstruction. In acute hepatitis, unless obstruction to the bile channels co-exists, the blood cholesterol may not be elevated. In the more severe cases in which necrosis is actually present, the blood cholesterol may be definitely decreased. Geill concluded from a study of 85 cases of jaundice that low cholesterol values at the onset of icterus favor a hepatitis and is against stasis jaundice; however, this was not an infallible finding. A blood Wassermann test is necessary in every case of icterus. A dark field examination of the blood is indicated in all cases of suspected hepatic icterus occurring in epidemic form or in patients with symptoms suggesting infectious jaundice. A blood culture, because of the possibility of a beginning bloodstream infection should also be considered in these cases. Non-surgical duodenal drainage has proven of aid to those who have had greatest experience in its use. Its value lies briefly in the following findings: (1) Absence of bile favors an obstructive jaundice which may be, however, either mechanical or catarrhal. It should be noted nevertheless that many cases of hepatitis may fail to yield bile for a short time. (2) An excessive quantity of catarrhal debris favors catarrhal jaundice rather than a primary hepatitis. (3) The finding of parasites such as giardia, lamblia and uncinaria, suggests the remote possibility of a parasitic duodenitis, as an etiologic factor. (4) When bile flow is established the finding of cholesterin crystals and calcium bilirubin crystals favors the presence of a "silent" stone in the common duct as the cause of the icterus.

X-ray studies of the gastro-intestinal tract, especially of the stomach and duodenum, may be of value in cases of painless jaundice occurring in later life, as a certain number of cases of pancreatic cancer cause a widening or distortion of the duodenal curve or produce an extrinsic type of defect in the pyloric end of the stomach. Gallbladder study by dye (Graham) technic is contraindicated. Urinalysis with the estimation of bilirubin and bile acids is of only slight help, as they are both present in hepatitis as well as in obstructive jaundice, but with the same blood bilirubin level, they will be found in much larger amounts in obstructive jaundice. The urine should also be examined for leucine and tyrosine crystals in all severe or protracted cases. Their presence usually indicate some degree of acute necrosis of the liver cells. Their absence does not eliminate this condition, as they are rarely found. Fecal analysis is of little value in this differential diagnostic problem, but it may show the presence or absence of bleeding into the gastro-intestinal tract, or may give evidence of pancreatic insufficiency, or rarely may disclose presence of cholesterin and calcium bilirubin crystals when gall stones are suspected.

BIBLIOGRAPHY

Barron, E. S. G., and Rich, A. R.: Cited by Barron, E. S. G.: Bilirubinemia. Medicine, 1931, **10**, 77.

Bockus, H. L., and Tumen, H. J.: Cyclopedia of Medicine, Philadelphia, Davis Company, 1933.

Gänsslen, M., Zipperlen, E., and Schüz, E.: Die hämolytische Konstitution. Nach 105 Beobachtungen von hämolytischem Ikterus, 39 Beobachtungen von leichten hämolytischen Konstitutionen und 19 Milzexstirpationen. Deutsches Arch. f. klin. Med., 1925, **146**, 1.

Geill, T.: Studies on Jaundice; Leukocytes in Diseases of Liver and Bile Passages, Especially Acute Hepatitis. Hospitalstid., 1931, **74**, 211.

McNee, J. W.: Splenomegaly in Britain; Investigations into Etiology, Pathology and Relative Frequency, with Tentative Classification. Glasgow M. J., 1929, **111**, 65.

McNee, J. W.: The Use of the van den Bergh Test in the Differentiation of Obstructive from Other Types of Jaundice. Brit. M. J., 1922, **1**, 716.

Resnik, W. H., and Keefer, C. S.: Jaundice Following Pulmonary Infarction in Patients with Myocardial Insufficiency. II. An Experimental Study. J. Clin. Investigation, 1925–26, **2**, 389.

Rich, A. R.: The Formation of Bile Pigment. Physiol. Rev., 1925, **5**, 182.

Rich, A. R.: Pathogenesis of Forms of Jaundice. Bull. Johns Hopkins Hosp., 1930, **47**, 338.

Morphine and Intestinal Activity. Antedating Plant and Miller,[1,2] morphine was held to be a "bowel splint," by virtue of its supposed immobilizing effect on the intestine. But since the appearance of the excellent contribution by the Iowa investigators, ample confirmation has been so forthcoming as to modify our views concerning the true action of morphine and certain other opium alkaloids on intestinal activity. Instead of inhibiting the intestine by a depressant action we now have the conception that in ordinary dosage of $\frac{1}{8}$ and $\frac{1}{4}$ grain, morphine attains its clinical advantages through stimulation of motility and tone. . . .

Summary: The action of morphine on the intestine was studied by the "balloon method" on seven occasions in five patients, with cecostomy, colostomy or a Mikulicz operation. In all cases, except one, some form of stimulation was soon observed in the area of intestine studied; in the exception, a delayed response followed strychnine depression. The beneficial effects of morphine's stimulating action on the bowel are discussed in relation to postoperative ileus, peritonitis, perforation and intestinal hemorrhage.

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[1] Plant, O. H., and Miller, G. H.: Effects of morphine and other opium alkaloids on muscular activity of alimentary canal; action on small intestine in unanesthetized dogs and man. J. Pharmacol. & Exper. Therap., 1926, **27**, 361.

[2] Plant, O. H., and Miller, G. H.: Effect of morphine and some of the other opium alkaloids on muscular activity of alimentary canal; action of morphine on colon of unanesthetized dogs and man. J. Pharmacol. & Exper. Therap., 1928, **32**, 437.

Extract from article by Frederick F. Yonkman, Ph.D., John M. Hiebert, M.D., and Harkishen Singh, M.D., *New England Journal of Medicine, March 12, 1936, p. 507.*

COMPENSABLE AGGRAVATION AND ACCELERATION OF PRE-EXISTING INFIRMITIES UNDER WORKMEN'S COMPENSATION ACT*

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In a certain workmen's compensation litigation, according to the findings, the employee had always been well prior to his accident save for high blood pressure and arteriosclerosis. He fell a distance of 8 feet striking the concrete floor. Thereafter he had amongst other injuries a lump on his head, in its left lower region. He no longer had control of his legs and fell down on frequent occasions. Dizziness, pain in the back and neck, and other symptoms were also complained of. Fifteen months later he died.

An autopsy revealed a recent hemorrhage in the brain substance and arteriosclerosis in such an advanced stage that it must have existed prior to the fortuity. The inner surface of the skull had been fractured in the region of the left lower wall. The former external lump due to the accident, the fracture, and the postaccidental hemorrhage corresponded in their locations to one another.

Defendant employer contended that the stroke was due exclusively to the hardening of the arteries, as the long interval of time elapsed negatived any connection with the fall. Claimants, on the other hand, argued in favor of such an association. Judgment was given for the claimants and affirmed on appeal.

The fundamental principle of law is that the employee must have been in the performance of duties growing out of the employment, or such as are incidental thereto, in order to be compensated for injuries. Where disability, or death, arises solely from disease and independently of employment, no recovery may be had.

Generally, it does not make any difference that the employee had been suffering from a preaccidental infirmity when he was hurt. The disability is compensated for regardless of the involvement of such an ailment. But, under some compensation acts there is an absolute apportionment between injury and preëxisting ailment. A third category of such legislation provides for restrictions of the employer's liability only in case of certain contingencies, as where there was no fatal injury aggravation, or where the preaccidental infirmity had not been truly arrested in its pathological course prior to the misfortune.

Preëxisting infirmities, according to the ideology of lawyers, are classified with reference to the amount of resistance which the defensive mechanism of the body offers to the progress of the morbid condition. There are truly arrested diseases. Other disorders are merely dormant or sleeping as to their advance. Finally, there exist pseudolatent, preaccidental ailments, actively progressing, but the progress is under cover, non-manifest (syphilis, for instance).

Some diseases cannot be aggravated by any accident. Others are subject to acceleration by industrial hazards. No matter to which of the three types of "aggravative" ailments the disorder belongs, some compensation is due to the employee when its acceleration arises out of the employment.

Unique features are to be found in the chain of events, characteristic of this type of litigation, and consisting of:

1. The industrial vulnerating force.
2. The primary injury due thereto—the original injury *per se*.
3. The after-effects thereof, which are reasonably immediate in time.
4. After-effects which are remote in time.
5. A preëxisting infirmity.

But since in compensable aggravation the vulnerating force must by necessity have also influenced the disorder, in addition one finds:

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* Condensed from Kentucky Law Journal, Vol. 22, May, 1934.

6. Strength of penetration of the vulnerating force into the territory of the preaccidental ailment, and when arrived thereat not only a vulnerative capacity, but also a vulnerating effect by the industrial force upon the disorder without interruption of the chain of events by some outside or remote cause.

7. The effects of the vulnerating force of the primary injury upon the preëxisting disease.

8. The after-effects, reasonably immediate in time; and, finally,

9. After-effects, remote in time.

Compensation is to be granted for aggravation only when at least the first 7 or 8 links of the chain of events have been proved.

There are 2 types of "earmarks" indicating compensability. Negative signs exclude the probability that the ailment came to its climax of disability without accidental injury. Positive evidentiary facts point directly to the employment as a proximate cause.

Negative Signs:

(a) Apparent good health prior to the accident. This raises the presumption in law that the employee would have continued to be capable of performing his duties. No culmination, independent of the employment, by the ailment may be deduced without further evidence to the contrary.

(b) Successful medical treatments prior to the calamity. Here, the course of the ailment must have been arrested. Its hazards must have been reduced at least temporarily and close in time to the fortuity; otherwise the claimant cannot avail himself of this evidentiary fact. Length, frequency, and effectiveness of treatments are controlling.

(c) Natural remission of the preëxisting disease prior to the accident. The remission must have been sufficiently strong before and at the time of the alleged accident in order to warrant that the ailment did not cause disability exclusively of the industrial bodily damage.

Positive Evidentiary Facts:

(d) Termination of disorder at a date earlier than to be expected otherwise. The termination of the ailment at a time earlier than reasonably to be expected if no accident had happened casts suspicion upon the latter. The suspicion is so much stronger the nearer in time thereto the termination occurs. A fatal issue is often particularly persuasive of causal relation with industry.

(e) Suddenness and rapidity of previously slowly advancing disorder. The longer previously the disease has been advancing slowly, and the sooner after the accident the sudden rapidity of course toward disability, or greater incapacity, comes into existence, the greater the evidentiary value in favor of the claimant, provided no intrinsic clinical cause otherwise can be ascertained for the events.

(f) Sudden awakening of arrested disease. In arrested ailments the sudden awakening to activity under similar circumstances generally leads to the conclusion of the industrial fortuity as an accelerating cause. However, an exception may exist in cases of pseudolatent, active disorders. A mere time-coincidence of manifestation thereof, independent of the employment, after the accident is possible. If the period of non-manifestation could have ended at any time before or after the accident happened, without its interference, claimant has not made out a case. But, where the period of non-manifestation could have continued much longer than the injury lasted, one would be justified in assuming that the accident contributed to the manifestation-aggravation, a fact warranting compensation.

(g) Sameness of seat of disorder and of injury. From close neighborhood it may be inferred that the injury has influenced the disorder, if localization of both is reasonably the same, and provided the vulnerating force has not been too weak.

But, even where the ailment is not a localized one, but rather generalized, as in syphilis, it may become aggravated. There is at first the injury with the exclusive complex of features characteristic thereof. Nothing is present to suggest the preëxisting infirmity. Suddenly, or gradually, however, the aspects of the injury change by taking on some or all of the traits of the disease. As to the injury the disorder left its stage of non-manifestation or dormancy. There is compensable aggravation.

(h) Lack of return to former state of health, or retardation thereof. When a previously apparently healthy employee does not return to his former state of health, or when such a return is greatly retarded, the accident must also have influenced some preaccidental infirmity. Strength, effectiveness, and other characteristics of the vulnerating force, and the extent and the course of the primary injury are important. If, in a truly healthy person, the same injury under similar circumstances would not have reached the magnitude of disability it did in the previously diseased employee; and if a substantial and comparatively timely recovery would not have been prevented as it was in the workman, some aggravation of a preëxisting disorder may be assumed to exist, unless the situation is explained by complications solely within the territory of the primary injury.

To come back to the opening case. It deals with remote-in-time aggravation after-effects. It has all the elements of the chain of events up to the last link. Defendant's contention that lapse of time made connection between death and previous injury unlikely is not well founded in law, even though the defense is able to point to the symptom-complex of arteriosclerotic brain disease. Concededly this would explain in a natural manner the ill-health of the workman after his accident. But his condition is also often associated with true apoplectic attacks of a light sort. Since it was probable that the accident itself caused such a hemorrhage at the time of the fall, it is equally reasonable to assume that the industrial misfortune ushered in a hemorrhage. It thereafter healed, but there was left a weak spot in the circulatory tree in that part which showed the later fatal hemorrhage and which matched with the bump and the fracture of the skull. This concurrence of locations gave the claimants their necessary preponderance of proof. The industrial injury made possible the later hemorrhage. Compensation was rightly granted.

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(*Continued from February, 1936*)

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Neoplastic Diseases

Neoplasms of the central nervous system, while strikingly different in their histopathological picture, are usually quite similar in their clinical manifestations. They may be divided into three groups: (1) Those that arise from the intrinsic tissue of the central nervous system itself, (2) those that arise from contiguous structures such as the meninges, the skull or the pituitary, and (3) those that are secondary implants from neoplastic foci elsewhere.

GLIOMA

The gliomas are those tumors originating from the cerebral tissue proper and include a number of varieties. They are by far the commonest type of brain tumor and comprise 43 per cent of Cushing's series of verified brain tumors.

Etiology. The etiology of brain tumors of all sorts, as of tumors elsewhere, is entirely obscure. Any number of reasons have been advanced to explain the causation of brain tumors, but none of these has proved conclusive. Occasionally trauma appears to bear a causal relationship, but the incidence of this observation is so rare that it may be only coincidental.

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* This is the sixth instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates. Other instalments will follow until completion.

Physiological and Pathological Considerations. The cells composing the various types of gliomas may represent any stage in the embryological development of the tissues of the nervous system. In general, the younger the type of cell composing the tumor the more rapidly growing and malignant the tumor may be considered. The tumors composed of adult cellular elements are usually more slowly growing and more amenable to surgical removal. Again, certain cerebral tumors have a predilection for certain locations, as well as for certain ages in life. For instance, the medulloblastoma is most often found in the cerebellum of young children, while the glioblastoma multiforme usually occupies the cerebral hemispheres in middle-aged adults. The astrocytoma may be found in any location of the brain, the brain stem, cerebellum, or spinal cord but usually occurs in adult life. The oligodendrogliomas are rather rare, slow-growing tumors frequently characterized by areas of calcification. In general, however, brain tumors of the glioma type may occupy any location in the central nervous system, and their clinical symptoms depend not only on their location but on the effect that they may have on the intracranial pressure as well.

Symptoms and Signs. As has been said, gliomas, as well as other brain tumors, give rise both to general and focal signs and symptoms. The general symptoms of brain tumor are due to changes in the intracranial pressure. If the tumor is located in such an area that it interferes very early with the circulation of the cerebrospinal fluid the general symptoms of increased intracranial pressure are apt to set in quite rapidly. This is true especially of those tumors that are located in the posterior fossa in the region of the cerebellum and brain stem. Tumors located in other situations, such as the cerebral hemispheres, may implicate structures only in that locality, and may, therefore, give rise to strictly local or focal symptoms. Even these tumors, however, if allowed to grow for a sufficient length of time, are quite apt eventually to produce symptoms of increased intracranial pressure. Other symptoms may also arise depending upon a variety of other changes such as direct pressure upon cranial nerves, edema of the brain or compression of cerebral blood vessels. Occasionally there may actually be erosion of the skull.

All of the general symptoms dependent upon increased intracranial pressure need not always be present in every case of brain tumor, but in practically all cases some of them will be present at some time in the course of the disease. Of these general symptoms headache is undoubtedly the commonest. It may be general or localized, persistent or intermittent. It is usually accentuated by such factors as might be expected to increase the intracranial pressure, such as coughing, sneezing or straining at stool. Vomiting is a symptom that is almost as common as headache. It is usually not related to meals and may or may not be accompanied by nausea. It is often but not necessarily projectile in nature. Vertigo is less common and is usually met with in the case of tumors situated in the posterior fossa, particularly those implicating the cerebellum. Convulsions, whether focal or generalized, are most often met with in the course of tumors in the region of the motor area. Mental, emotional, and psychic changes are quite frequent and include all types of manifestations. The pulse rate is frequently slow. Finally, an extremely frequent and characteristic sign is that of papilledema or choking of the optic discs.

As regards focal symptoms there is nothing in the clinical symptomatology of the gliomas that serves to distinguish them from other types of cerebral tumors. Depending upon the location of the tumor within the central nervous system certain clinical symptoms result that may give valuable indication as to this location. The history of the onset of symptoms and their chronological development may be of value in distinguishing the symptoms of brain tumor from other pathological types of disturbance. It should also be borne in mind that tumors in one location may result in symptoms that suggest a lesion in a far-removed part of the nervous system. With the increase in size of the tumor other symptoms referable to the generally increased intracranial pressure may appear and as a result make the problem of localization more difficult. It may be well to review briefly certain prominent disturbances of function that may be attributed to tumors in various lobes of areas of the brain.

Tumors of the frontal lobe may remain silent for a long period of time and even eventually produce only such vague symptoms as those referable to mental, emotional or psychic disturbance. Of the physical symptoms, one that is occasionally met with is that of forced grasping with inability to relax the grip promptly. In tumors growing downward in the frontal lobe there may be involvement of the optic or olfactory nerves on that side with consequent disturbances in vision and olfaction. Tumors of the frontal lobe frequently simulate cerebellar disturbances in that ataxia is often a prominent feature. If the tumor is situated farther back or presses upon the motor cortex the most prominent symptoms are those of paralysis or of convulsions, the latter frequently preceding the former. Tumors in the motor speech area or Broca's area usually give rise, if situated on the left side in right-handed persons, to motor aphasia. Tumors in the parietal lobe and in the postcentral area are especially liable to produce disturbances in sensation. This disturbance is principally in sensory discrimination, while the grosser modalities of sensation may be preserved. Astereognosis, or the inability to recognize objects by touch, is a symptom that points particularly to parietal lobe involvement. Tumors of the temporal lobe usually give rise to disturbances in the spheres of taste, smell and hearing, particularly the latter. Auditory aphasia, with inability to interpret the spoken word is quite common. If the tumor is located posteriorly in the temporoparietal region about the angular and supramarginal gyri there is also associated the so-called visual aphasia. If the hippocampal area is affected uncinate fits or hallucinations of smell may be complained of. If the tumor is deep-seated there is very frequently a disturbance affecting the fibers of the optic radiation with a resulting homonymous hemianopsia. In tumors of the occipital lobe a variety of visual field defects of the homonymous type may be encountered. There may also occur visual hallucination or a visual aura preceding convulsions. Tumors of the subcortical centers, especially the basal ganglia, may for a long time give only general symptoms. Suggestive focal symptoms are unilateral tremor or rigidity or intractable unilateral pain combined with signs of increased intracranial pressure. Tumors of the midbrain frequently result in disturbances of the pupillary reactions and of the extra-ocular musculature. The pyramidal tracts also are frequently affected. Such tumors very often compress the aqueduct of Sylvius and result very early in definite symptoms of intracranial pressure. Tumors of the pineal body most frequently produce symptoms of precocious puberty accompanied by secondary symptoms of involvement of the midbrain and colliculi. Tumors of the cerebellum give rise to two principal symptoms, namely, those of vertigo and of ataxia. A number of associated symptoms such as dysmetria and nystagmus may also be noticed. Again, due to their location, tumors of the cerebellum very early cause symptoms of increased intracranial pressure. In view of the concentration of fiber tracts and nuclei in the brain stem, tumors of the pons and medulla usually give rise to a multiplicity of symptoms referable to the anatomical structures involved.

Course and Prognosis. The course of all gliomatous tumors is practically the same in all cases, only the element of time varying with each. The glioblastomas and the medulloblastomas are rapidly growing, infiltrating tumors that usually terminate fatally within from 12 to 18 months. Tumors composed of more adult cellular elements, such as the oligodendrogliomas and the astrocytomas, grow much more slowly, are apt to be more circumscribed and may persist for years without giving rise to serious symptoms. Both of these types of tumors frequently show calcification and have a tendency to be more sharply delimited than the previously mentioned types. The astrocytoma often becomes cystic. Very rarely one of these tumors may become calcified and apparently completely arrested in its growth. As a general rule, however, all gliomas end fatally unless treated by surgery or by X-ray.

MENINGIOMA

Etiology. The etiology of the meningioma is unknown. Very rarely one encounters a case in which trauma appears to have been a precipitating factor. They comprise approximately 14 per cent of all brain tumors and are commonest in adult life.

Physiological and Pathological Considerations. The meningiomas arise from the pi-arachnoid and dura. They are usually hard, fairly well encapsulated and circumscribed, sometimes adherent to underlying structures and usually develop a fairly rich blood supply. They may occur anywhere over the surface of the cerebrum, cerebellum, the base of the brain, the brain stem, and the spinal cord. They are composed of elongated uniform cells arranged in strands and whorls. Calcification within the meningiomas is common. They are found most frequently over the cortex and in the course of the olfactory groove. As a general rule they grow rather slowly and affect the brain by compression rather than by infiltration and destruction. They may also result in pressure upon the bony skull and cause thinning of the inner table. Generally they cause symptoms of increased pressure rather late on account of their slow growth and are more apt to betray themselves by focal symptoms. These focal symptoms naturally depend upon the area of the brain affected.

Symptoms and Signs. The symptoms of the meningiomas are usually focal, with signs of generally increased intracranial pressure occurring rather late in the course of the disease. The history is usually a rather long one with a slow progression of symptoms. Convulsive attacks of the Jacksonian type, particularly if of long standing are especially suggestive of the presence of a meningioma. Meningiomas arising from the olfactory groove may cause unilateral loss of the sense of smell. Meningiomas arising from the lesser wing of the sphenoid bone may cause unilateral exophthalmus accompanied by homonymous quadrantic field defects.

Course and Prognosis. In general, the course of the meningiomas is a very slowly progressive one with fatal symptoms arising only when the meningioma has attained such a size as to cause severe disturbance of the circulation of the cerebrospinal fluid or when by its growth it interferes with the function of vital centers.

METASTASES

Etiology. Metastatic tumors naturally arise from tumors in other locations in the body. They generally occur in adult life and are comparatively unusual, comprising only 4 per cent of Cushing's series.

Physiological and Pathological Considerations. The majority of metastatic tumors of the brain are carcinomata, many of which originate primarily in the lung or bronchi. Tumors of the breast, prostate and adrenal glands also frequently metastasize to the brain. The metastatic nodules are practically always multiple and resemble in histological structure the source from which they originally sprang. The multiplicity of lesions naturally gives rise to a variety of clinical symptoms and signs that are at times extremely confusing.

Symptoms and Signs. The clinical symptoms of metastatic tumors of the brain are obviously difficult to evaluate. In general there is a rather rapid onset of a single symptom referable to a certain location, such as aphasia or a single motor paralysis. Usually following this a variety of disturbances appear that may run the whole gamut of neurological symptomatology and that soon become associated with signs of increased intracranial pressure.

Course and Prognosis. The course of metastatic malignancy of the brain is uniformly and rapidly fatal.

OTHER TYPES OF NEOPLASM

In this group we have a variety of tumors, most of them quite rare. There are two exceptions to this statement, namely, the pituitary adenomas and the acoustic neurinomas, both of which are fairly frequently met with.

The pituitary adenomas are divided into 2 main groups principally on the basis of their histological structure as well as on their clinical manifestations. Both have in common the fact that they produce changes in the visual fields and in the sexual functions. Both have a tendency to appear in comparatively young people.

The chromophobe adenoma, which is composed of faintly staining cells found in the anterior lobe of the pituitary, is the commoner of the two. Originating as it does in the pituitary gland its growth results eventually in destruction of the sella turcica and pressure upon the optic chiasm. The effects of this pressure are first evidenced by an early bitemporal hemianopsia which may later progress to complete blindness.

Symptoms of hypopituitarism precede or accompany the visual disturbance. In the male, sexual libido and potentia decrease and disappear along with a number of the secondary sexual characteristics. There is loss of the facial, axillary and pectoral hair, and the pubic hair assumes the feminine distribution. There is usually increase in body weight and increase in the subcutaneous fat, particularly in the region of the breasts and the hips. In the female, amenorrhea and sterility are common. In both males and females there is usually some lowering of the basal metabolic rate.

The chromophile adenomas are composed of eosinophilic cells and result also in visual field defects, loss of libido, amenorrhea and sterility. The typical feature, however, is in the disturbances of bony growth. If the condition occurs in childhood or early adolescence gigantism results. The changes in acromegaly are rather gradual; they consist principally in increase in the size of the head, the jaw, and the hands and feet. Exostoses of the terminal phalanges of the head and the feet also occur. The increase in the size of the jaws affects particularly the lower jaw, resulting in a marked prognathous appearance. Both the chromophobe and the chromophile tumors may cause by pressure symptoms referable to neighboring structures, of which polyuria and polydipsia are the commonest. A third adenoma, the basophilic adenoma, has been described by Cushing and results in a rather specific clinical syndrome, consisting of adiposity of the face and body, increase in bodily hair, amenorrhea, hypertension and purple striae over the abdomen.

The acoustic neurinomas occur approximately half as frequently as the pituitary adenomas, comprising about 9 per cent of all tumors. They occur usually in patients in early middle life. They spring from the sheath of the acoustic nerve, are usually well encapsulated, and produce symptoms referable to the disturbance of structures in the region of the cerebellopontile angle. They are usually very slow-growing and generally produce a fairly typical clinical picture. The first symptom is usually of tinnitus in one ear which is followed in a variable period of time by deafness in that ear. Later on there are disturbances in the sphere of the trigeminal nerve, usually in the form of disagreeable sensory disturbances over the face. These may be accompanied or followed by signs of facial weakness on the same side. With further growth of the tumor compression of the cerebellar structures and of the structures of the brain stem occurs with resulting vertigo and staggering. With further compression of the brain stem, signs of increased intracranial pressure develop. Clinically these patients show unilateral deafness, disturbances of sensation over the face and cornea and frequently facial weakness, as well as other less distinctive signs referable to involvement of the cerebellum and brain stem.

Among the less common tumors may be mentioned the ependymomas, which comprise about 4 per cent of all brain tumors and usually occur within the ventricular system, especially in the region of the fourth ventricle. They usually grow slowly, but due to their peculiar location they are often rapidly fatal.

The pineal tumors grow in the region of the pineal gland and are most frequently found in children. They cause early signs of increased intracranial pressure along with various extraocular muscle disturbances and early precocious puberty. They, too, are usually rapidly fatal. Craniopharyngiomas develop in children and probably spring from residuals of Rathke's pouch in the embryo. They are usually large and cystic, lying anteriorly and above the sella turcica. Clinically the children show bitemporal hemianopsia, increase of the body fat, and failure of development of the sexual functions and characteristics. The congenital tumors, such as dermoids and teratomas, are extremely rare and also difficult to diagnose clinically. The blood-vessel tumors are the angiomas and hemangiomas. These are commonly associated with vascular abnormalities elsewhere, frequently result in convulsive attacks and may also betray themselves by a characteristic bruit.

DIAGNOSIS OF NEOPLASTIC DISEASES

Glioma. It is difficult to distinguish clinically the gliomas from other types of brain tumor. This is particularly true in the case of the slow-growing gliomas such as the astrocytoma. The best that can usually be done is to diagnose the presence of a brain tumor of some variety and its approximate location.

The history is extremely important. A history of rapid progression of focal symptoms, combined with evidence of increased intracranial pressure, usually indicates the presence of one of the more embryonic and malignant types of tumor. In a child with predominating cerebellar signs, a medulloblastoma may safely be diagnosed, as a rule. It is in connection with the diagnosis of brain tumor that the importance of ophthalmological examination must be stressed, as well as that of careful perimetry. Increase in intracranial pressure is most frequently reflected in the appearance of the optic fundi and in changes in the visual fields. Engorgement of the retinal vessels, blurring of disc outlines, edema of the disc and varying degrees of retinal hemorrhage are very often almost pathognomonic of brain tumor, especially when considered in conjunction with the history and physical findings. Changes in the visual fields are also common and may be of immense localizing value. The most common change of this kind in generalized increase in intracranial pressure is the enlargement of the normal blind spot.

Spinal fluid changes, too, are important in diagnosis. There is usually increase in pressure, although this may not be true in very early tumors, especially if located above the cerebellar tentorium. If the tumor is below the tentorium the pressure is often high. The protein content of the fluid is usually increased, especially so if the tumor is situated near the ventricles or subarachnoid space. It is often yellow in color and may contain a few lymphocytes. As regards lumbar puncture in cases of suspected brain tumor, certain precautions should be rigidly observed. If the tumor shows evidence of being located in the posterior fossa, and is accompanied by signs of markedly increased pressure, lumbar puncture should not be attempted, since herniation of the medulla through the foramen magnum is a frequent and often fatal complication. Even under more favorable circumstances the procedure should be carried out extremely cautiously and under no circumstances should the fluid pressure be suddenly dropped by the rapid removal of spinal fluid.

In cases in which localizing signs are vague or absent, air injection should be carried out.

(*Continued on page 88*)

MEDICAL ANNALS
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SPECIFIC VERSUS SYMPTOMATIC TREATMENT FOR THE LOCAL HEALTH SITUATION

Recent activities of the Medical Society of the District of Columbia have been most successful in focusing the attention of the citizens of Washington upon the deplorable situation arising from inadequate financial support of the public health program of the Health Officer and Board of Public Welfare. This achievement is a most meritorious and commendable public service, and one that has received signal recognition from the public and press. Since the lay friends of the Medical Society have thus so thankfully accepted its guidance, and so wholeheartedly acclaimed and coöperated with it in its efforts, it would certainly be deplorable if it should now slacken in its endeavor, or fail to take advantage of the position of leadership that the exigencies of the situation have thrust upon it. If we be agreed, then, that this is unthinkable, and that we must continue the leadership so promisingly initiated, it would seem well to take stock of the present situation in all its ramifications.

The Medical Society of the District of Columbia is in the position of a specialist who has been asked to see an ill patient, complaining, mainly, of one very troublesome symptom; it behooves it, therefore, not to make the mistake, all too frequent in special practice, of overlooking the whole picture of the disease in a too meticulous scrutiny of the symptom falling within its own sphere of practice. To do this means failing to attach due significance and weight to the whole clinical picture and to the psychological problems involved. As physicians we should realize that specific therapy can only be successfully directed toward fundamental conditions and that symptomatic treatment is only to be tolerated when the underlying etiological factor remains obscure or entirely unknown. The present disgraceful inadequacy of the public health budget for the District is not the only symptom of the disease now threatening our corporate, municipal life. Some other symptoms, of almost equal importance in establishing the diagnosis, even if less distressing and obvious, are inadequate police and fire protection, inadequate facilities for public education, the over-crowded and congested condition of our police courts, and the lack of adequate terminal facilities for air transportation. Thus assembled, these clinical symptoms point very clearly to an underlying condition equally responsible for all of them, the diagnosis of which can now be made. The disease is at once seen to be properly classed among the malnutritions, and its basic etiological factor is readily discernible in the anomalous nature of the fiscal relationship between the Federal Government and the District.

Having thus visualized the clinical picture as a whole, the consideration of its treatment can be intelligently undertaken. If this is to effect a permanent cure, and not result in merely temporary alleviation of the more distressing symptoms, it must be directed toward the removal of the underlying cause; this is a fundamental principle of sound therapy. Furthermore, there is abundant evidence to support the contention that the municipality, like the individual, is mentally handicapped by financial considerations; it naturally wishes to be cured as cheaply as possible. However, once the serious and critical nature of the disease is thoroughly realized, the usual trite demand of—"Doctor, please spare no expense"—will not only be heard, but will be meant. To overlook this fact is to underestimate the importance of the patient's psychology. As a community is it not possible that our attention has been too narrowly directed toward a few entirely negligible politicians in Congress, bent on making political capital at home by berating District citizens, and not enough toward the fact that Congress, as a whole, must be well disposed toward the city in which its members live a large part of each year? Do we not tend to demand increased appropriations to support necessary and vital municipal activities with the same breath in which we demand no increase in local taxation? Would not the former demand come with better grace, and be more likely to be met with sympathetic consideration, were it coupled with an expression of willingness to pay our just share of the cost when equitably determined? So far the Medical Society of the District of Columbia is the only civic group that, by formal resolution, has expressed the willingness of its members to meet increased taxation, should it be proven necessary to underwrite an adequate health budget. These questions are fundamental in the whole distressing situation.

Difficult as the details of an equitable fiscal accord between the Federal and District Governments seem to be, in the light of the history of the operation of the Organic Act, the general principles which should govern, in the circumstances, would seem to be of the utmost simplicity and so obvious as to merit immediate and well-nigh universal acceptance. There would seem to be every consideration of sound political expediency to justify the provision of the Constitution that the Congress should have exclusive jurisdiction and control over the seat of the Federal Government. Acceptance of this autocratic authority, however, places a heavy moral obligation on the Federal Government, not only to the disfranchised citizens of Washington, but to the citizens of the whole nation. To the former the obligation is a matter of right and equity, an application of the golden rule; to the latter it is to so use its authority as to make the capital of the Nation an illustrious example of what the fullest and best municipal life should be. Why should there be acrimonious discussion as to the equitable proportionate share of the cost of such an achievement to be borne by the local tax-payers and the Federal Government? The former are surely morally obligated to be cheerful when taxed as are the citizens of comparable urban communities; is this figure one impossible of determination with all the statistical data available to governmental agencies in the District of Columbia? The latter is most certainly morally obligated to underwrite, not alone the additional expense of making Washington, in a physical sense, the greatest capital in the world, but the still further expense of making it a shining example of the potentialities of corporate, municipal life. And if there be those, within or without Congress, who wish, for personal reasons, to point out that in this latter respect the local citizen would be getting something for nothing, their blatancy is easily deflated. The citizen of Washington has paid the price; he has given up the most priceless boon of the free man—liberty, and surely there should be some adequate recompense.

We hold these facts to be self-evident; what is bitterly needed now, and has been lacking far too long, is a fearless and aggressive civic leadership in their presentation not only to the Congress, but to any governmental agencies concerned and even to the President. If it be true, as recently pointed out in the press, that District officials are kept impotent in this respect, by governmental regulation, the remedy is obvious; the citizens should provide their own leadership. For this purpose the committee elected at the recent mass meeting, and now organized and functioning, is an excellent start. But while its membership represents a variety of interests, it is concerning itself with one phase of a many-sided problem; persons having special knowledge of educational, fiscal, legal and other phases should be added to its roster. It might well be the nucleus of a citizens' committee of 50, or even 100, to provide the leadership and guidance so sorely needed in the present situation.

To revert to our medical allegory—Washington is ill. The disease from which it is suffering is a chronic one, subject, however, to acute exacerbations and most complicated and puzzling in many of its manifestations; fortunately it is curable. To this end advice and treatment must be contributed by specialists in many branches. These must work in coöperation and accord if health is to be restored, but they must also avoid a merely symptomatic treatment and aim at eliminating the basic pathological lesion; they must treat the patient as a whole, and not disease symptoms.

P. W.

TRANSACTIONS OF THE SOCIETY

Stated Meeting, March 4, 1936

The following were duly elected to membership:

Active Members

Garnet Walter Ault, 1801 Eye Street, N.W.
Walter Willard Boyd, 1835 Eye Street, N.W.
Neil Porter Campbell, 1409 Newton Street, N.W.
Russel Jon Jansen, 3320 Seventeenth Street, N.W.
Glen Pincock, 1029 Vermont Avenue, N.W.
Mario Scandiffio, 1954 Columbia Road, N.W.
Daniel Lamont Seckinger, District Health Department
Maynard James Simmons, 1809 Kenyon Street, N.W.
Alexander Contee Thompson, 1835 Eye Street, N.W.

Reinstated to Active Membership—Samuel Ross Taggart
Reinstated to Associate Membership—Charles L. Smith

Applicants for membership to be voted on in May, 1936:

For Active Membership

Joseph Felix Belair, Georgetown University—1933
Crenshaw Douglas Briggs, Johns Hopkins University—1928
Radford Brown, George Washington University—1923
Linn Fenimore Cooper, Harvard University—1926
James Thomas Jackson, Vanderbilt University—1928
Leland Ernest Stevenson, George Washington University—1934
John Francis Warren, Georgetown University—1932

For Associate Membership

George Elbert Farrar, Jr., Johns Hopkins University—1931
Morris Kleinerman, University of St. Andrews—1933
Felipe Andres Martinez, Georgetown University—1932

Pursuant to Chapter VI, Article II, of the Constitution, a Nominating Committee was elected by the Society to select nominees for each elective office. The personnel of the committee is as follows:

Harry A. Fowler, *Chairman*
J. Lawn Thompson
R. Arthur Hooe
Charles S. White
John A. Reed

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The regular meeting of the Washington Society of Pathologists was called to order at 1:30 P.M., February 1, 1936, in the Army Medical Museum by the President, Dr. Wallace M. Yater. There were 91 members and guests present.

Scientific Papers

1. "Undulant Fever (Brucellosis)." **Edward Francis, M.D.**, National Institute of Health.

Cases of undulant fever have been recognized in every state of the Union, about 1,500 being reported annually. The most common methods of human infection in this country are the drinking of raw cow's milk, contact of the hands with aborting uteri of cows and hogs or with the expelled animal fetuses and fetal membranes. Cases due to goat's milk and goat contact are limited to our southwestern states.

The symptoms are practically the same whether the cases are of cow, hog or goat origin. Briefly, the disease is manifested by chills, fever, sweats, loss of weight, weakness, neuralgia and joint pains. These acute symptoms also suggest tuberculosis, malaria, rheumatic fever, typhoid, and the typhoid type of tularemia. In the later stages of undulant fever, Brucella organisms have been isolated from a swollen joint in arthritis, from the testicle in orchitis, from the ovary in oophoritis and cystic ovary, from the blood in acute endocarditis, from the breast in mastitis, from the spinal fluid in meningitis and meningoencephalitis, from the humerus and wrist in chronic osteomyelitis, from cervical glands (thought to be tuberculous), from pleural fluid (also thought to be tuberculous), from bile in a drained gallbladder, from feces, from an abscess in spondylitis, from 35 pairs of tonsils, and from 1 aborted human fetus.

Final diagnosis is made by isolation of a culture of Brucella bovis (the bovine type), Brucella suis (the porcine type) or Brucella melitensis (the caprine type) from the patient's blood or other tissue, either directly by inoculation to culture medium or indirectly from an inoculated guinea-pig. Reliable diagnosis is also furnished by a positive agglutination test. The phenomenon of hypersensitivity in undulant fever is utilized for a skin test which when performed with controls by an experienced and competent physician is reliable but in unexperienced hands may be very misleading.

Prevention is best found in the use of pasteurized milk, the efficacy of which has been amply demonstrated by the practical absence of cases of undulant fever in the District of Columbia. Avoidance of contact with the recognized sources is incumbent. There is no generally accepted form of treatment.

2. "The Pathology of Undulant Fever in Man."

R. D. Lillie, M.D., National Institute of Health.

The gross postmortem findings in undulant fever may be astonishingly slight, and in some cases the microscope may reveal little more. The disease is apparently primarily a septicemia and shows the usual concomitants of visceral congestion, cloudy swelling and splenomegaly. A definite splenomegaly was recorded in 4 of the present series of 6 cases, and pulp engorgement in 1 of these and in both of the others. The spleen pulp showed diffuse or focal lymphocyte infiltration of variable grade in 5 cases. Focal lymphocyte infiltration occurred also in other organs, in the periportal spaces of the liver in 3 cases, in the renal cortex in 3 cases, and in the pancreas, lung, epicardium and gallbladder mucosa in 1 case each.

A recent vegetative or ulcerative endocarditis, often diagnosed as subacute bacterial endocarditis, has occurred with sufficient frequency in undulant fever, so that it is now considered part of the disease. Such a process occurred in 2 cases of this series; aortic in 1 with cardiac hypertrophy, transudation into the serous cavities and centrolobular necrosis in the liver; and in the other superimposed on an old mitral stenosis, with cardiac hypertrophy, splenic infarcts and passive congestion of the liver. Hepatic passive congestion was noted also in another case in which no obvious heart lesion was found.

Complicating pneumonias have been of not infrequent occurrence. These were seen in 2 cases of this series, 1 nodular and hemorrhagic, with gram positive cocci in the sections, and 1 massive, with an exudate of large round cells, fibrin and blood.

Focal lesions have been noted fairly often in recent literature, occurring most often in the spleen, also in lymph nodes, liver, bone marrow, meninges and serous membranes. In this series splenic focal lesions were identified in 3 cases and hepatic in 2, and lesions were found in 1 case each in the kidney, pancreas and lymph nodes. In the liver they were partly coagulative necroses with hemorrhage or with leukocyte infiltration in some foci; partly abscesses bordered by epithelioid cells and macrophages, in 1 case surrounded by fibroblast proliferation. In the spleen they were once minute hemorrhages, once small abscesses, both bordered by phagocytic macrophages, and once nodules of lymphocytes and plasma cells, mingled with a few polymorphonuclear leukocytes and phagocytic macrophages. In the kidney pyramid there was a single abscess bordered by leukocytes, monocytes and epithelioid cells and surrounded by proliferating fibroblasts. In the pancreas a single small focus of polymorphonuclear infiltration with surrounding degeneration of the parenchyma was noted. The lymph nodes contained nodular masses of proliferating reticuloendothelial cells with multinucleated giant cells and no necrosis. Necrosis and leukocyte participation in the focal lesions have been more prominent in this series than in the literature. In this, the lesions in this series approach more closely those seen in guinea-pigs.

Reticulo-endothelial reactions with macrophage exudation are prominently mentioned in the recent literature, occurring most often in lymph nodes and the spleen. Macrophages in the splenic pulp were few in 2 cases of this series, moderately numerous in 3 and numerous in 1, and erythrophagia was prominent in 2 cases. Notable Kupffer-cell proliferation occurred in the liver in 1 case. In all 3 cases in which lymph nodes were studied there were variable amounts of sinus reticulo-endothelial proliferation and of sinus exudation of macrophages and a few leukocytes, plasma cells and lymphocytes. Erythrophagia was prominent, but necrosis was absent.

Other lesions reported in the literature but not studied in this series are meningitis, spondylitis, marrow foci, other bone lesions, oophoritis, orchitis, prostatitis, seminal vesiculitis, cutaneous eruptions, and a fairly frequent thrombophlebitis. Of these the last 4 have apparently not been studied pathologically.

In the discussion, **Dr. R. M. Choisser** asked what titre of serum was diagnostic. **Dr. Francis** replied that a patient having undulant fever may have an agglutination of only 1 to 10; however, this titre will increase after a week or two generally. A poorly reacting patient may keep a low titre.

Presentation of Cases

The second part of the meeting was called in the histology room at 2:45 P.M. Fifteen members were present.

Dr. R. D. Lillie demonstrated several microscopic slides of tissues from cases of undulant fever.

Dr. J. W. Miller presented a slide showing a typical text-book picture of silicosis. This slide was received from Dr. Merriweather of London and came from a sand blaster, who had had the disease for 9½ years. No tuberculosis was found at autopsy.

Dr. R. M. Choisser demonstrated 2 slides made from a liver of a chicken purchased at the market. In the discussion **Dr. R. D. Lillie** thought that the picture was that of leukosis of fowls, lymphatic type (a pseudoleukemia). **Dr. Walter Freeman** noted that the etiologic agent was thought to be a filtrable virus.

Dr. Choisser also presented a case of a 30-year old white woman who had toxic goiter in 1925, a subtotal thyroidectomy in 1930 and a nodular recurrence and recent removal. She had lost only 10 pounds in the past 3 years. The operative specimen appeared to be a low-grade carcinoma which had been secreting thyroxin. In the discussion, **Dr. H. A. Davis** noted that 15 per cent of carcinomata of the thyroid gland showed signs of thyroid toxicosis. The low-grade, well-differentiated tumors are more able to produce hyperthyroidism. **Dr. Wallace M. Yater** cited a case in which the removed specimen contained an excessive amount of thyroxin. **Drs. R. D. Lillie** and **J. G. Pasternack** questioned the diagnosis of carcinoma of this case. **Major Raymond O. Dart** noted that with the pleomorphism mitoses, low-grade carcinoma was indicated. **Captain Elbert De Coursey** asked if invasion of vessels by carcinoma cells had been found in the sections. **Dr. Choisser** answered that none had been found.

Dr. P. M. Ashburn presented a case of a 32-year old white man who had had a mass the size of a football in the left upper quadrant. He was admitted to the hospital, and an exploratory laparotomy was done December 6, 1935, the tumor being removed. The mass was irregularly shaped and apparently arose from and replaced the left kidney. Pus from the left ureter was cultured and gram negative bacteria were grown. The kidney pelvis and ureter occupied the lower left quarter of the abdomen. In the discussion, **Drs. Raymond O. Dart, Walter Freeman** and others voted carcinoma of obscure origin. **Captain Elbert DeCoursey** asked why not consider the origin the same as that of the Wilms' mixed tumor with preponderance of adenoid arrangement. **Dr. R. M. Choisser** noted that very little mitosis or anaplasia appeared. **Dr. R. D. Lillie** thought that it could be classified as an embryonal carcinoma. **Major Dart,** having studied the slide during discussion, thought that the carcinoma was an infiltrating papillary anaplastic epidermoid tumor from the renal pelvis; **Captain DeCoursey** agreed.

Dr. Walter Freeman presented the case of a man who in 1935 had tabes dorsalis; in 1928 he was given malarial therapy; in 1929 he had a gumma on the shin; in 1930 ascites developed followed later by hematemesis requiring hospitalization; in 1933 severe pain began in the leg for which he received alcohol and glucose, resulting in alcoholism. Alcohol was given intraspinally for the severe pain, 1 cc. first and then 2 cc. Paralysis of the legs with disturbance of urination was followed by cystitis and then death. Microscopic sections of the lumbar cord and cauda equina showed degeneration from the alcohol. In the discussion it was noted that this was a very beautiful demonstration of degeneration following alcohol injection of nerves. **Dr. Freeman** added that alcohol was a very satisfactory reliever of pain, particularly in spinal anesthesia.

Major Raymond O. Dart told of the illness of **Major James E. Ash,** a former President of the Washington Society of Pathologists. Major Ash is now seriously ill with a streptococcus hemolyticus septicemia and erysipelas contracted while doing an autopsy.

Captain Elbert DeCoursey presented a slide of basal-cell carcinoma of the thigh showing multicentric origin. This was shown as a bit of evidence that all carcinoma does not originate from a primary single cancer cell. Captain DeCoursey also presented a slide showing numerous acid-fast bacilli in a tuberculous area of lung; this was shown to demonstrate the large numbers of bacilli which sometimes are present in lesions of tuberculosis. In the discussion **Dr. J. G. Pasternack** noted the possibility of these apparently separate basal proliferations of cancer being connected by tortuous strands not shown in the section. Captain DeCoursey stated that this was a definite possibility but that in a series of sections no lateral ramifications of epithelial tissue had been demonstrated below the basal buds of cancer.

Dr. Wallace M. Yater showed sections of pleural exudate containing collections of carcinoma cells from a patient presenting evidence of pleural and other metastases from carcinoma of a breast removed 5 years before.

Dr. Walter Freeman moved that the next meeting be held on the second Tuesday of March at 8 P.M. Dr. P. M. Ashburn seconded the motion which was passed.

The meeting adjourned at 4:10 P.M.

COMING MEETINGS

Wednesday, March 25: Alfred Stengel, M.D., Professor of Medicine, University of Pennsylvania.

Wednesday, April 1: Business Meeting. Reports of Committees, etc.

Wednesday, April 8: Presidential Address: "Forty-two Years in Medicine." Buffet Supper.

Wednesday, April 15: Program to be furnished by the Section on Neurology & Psychiatry.

Wednesday, April 22: 1. "The Results of Orthoptic Training." William Thornwall Davis, M.D.
2. "Acute Mesenteric Adenitis." Charles Stanley White, M.D.
3. "Thorotrast Arteriography." Wallace M. Yater, M.D.

Wednesday, April 29: "The Protection of Health in the Soviet Union." Henry E. Sigerist, M.D., Professor of the History of Medicine, and Director of the Institute of History of Medicine, Johns Hopkins University

Annual Scientific Assembly

May 6-7, 1936

Arrangements are proceeding under the general direction of Dr. Victor R. Alfaro. Printed programs will be ready for distribution at an early date. The social features, noon-day luncheon and banquet, will have speakers and appropriate entertainment. Members of the Society should note especially the meeting for the Washington Public on Wednesday evening, May 6, under the direction of Dr. G. Victor Simpson, who is arranging a program of popular appeal.

Scientific Program

Included with the papers to be read are the following:

"Some Consideration of the Endocrines as Related to Tumors: Particular Reference to Testicular Tumors," Janvier W. Lindsay, M.D.; "A Surgical Method of Treating Angina Pectoris and Congestive Heart Failure," James Alexander Lyon, M.D., and Edmund Horgan, M.D.; "Consideration of the Methods of Treatment of Persistent Occipito-posterior," J. Bay Jacobs, M.D.; "Primary Cancer of the Lung," Colonel H. C. Pillsbury, M.C., U. S. A.; "The Treatment of Cardiovascular Syphilis," John C. Reisinger, M.D.; "The New York Plan of Attack on Syphilis," Walter Clarke, M.D., New York City; "The Relation of the General Practitioner to the Specialist in the Larger Centers," Upton D. Nourse, M.D., Dawsonville, Md.; "The Diagnosis and Treatment of Tumors of the Intestinal Tract," William Wayne Babcock, M.D., Philadelphia; "The Treatment of Eye Injuries," James N. Greear, Jr., M.D.; "The Painful Shoulder," Guy W. Leadbetter, M.D.; "Causes and Treatment of Deafness," Earle G. Breeding, M.D.; "Basic Clinical Factors in Evaluating Treatment and Prognosis in Hyperthyroidism," R. Lomax Wells, M.D.; "Practical Problems in Glomerulonephritis," James P. O'Hare, M.D., Boston; "Surgical Aspects of Renal Insufficiency," Ralph M. LeComte, M.D.; "Gastroscopy as an Aid to Diagnosis," Chevalier L. Jackson, M.D., Philadelphia; "The Value of a Complete Change of Scene for the Nervous Patient," Roger S. Cohen, M.D.; "Arterial Embolus and Its Treatment," Fred R. Sanderson, M.D.; "Carcinoma of the Body of the Uterus," Henry L. Darner, M.D., and R. Rhett Rathbone, M.D.; "Diagnosis of Tuberculosis in Childhood," Margaret M. Nicholson, M.D.

The Wednesday afternoon session will be held jointly with the Maryland, Virginia and District of Columbia Medical Association. Dr. W. C. Welburn, President, will make the introductory remarks.

Among the instructive motion pictures to be shown are the following:

"The Physiology of Fertilization of the Human Female," "Intracranial Injuries in the Newborn," "Essentials of Electrocardiography," "Methods for the Determination of Bleeding Tendency," and "Diagnostic and Therapeutic Procedures in Pediatrics."

The Scientific Exhibits will include:

Surgical Anatomy of the Thyroid Gland in Reference to Its Total Ablation (Drawings, Models and Motion Pictures in Color), Charles Stanley White, M.D., and J. Lloyd Collins, M.D.; Photographs of Skin Diseases, Russell J. Fields, M.D.; Urographic Demonstration of Lesions of the Genito-urinary Tract, W. Calhoun Stirling, M.D.; Materials and Technics of Contraceptive Practice, Walter R. Stokes, M.D.; Arthritic Exercises (Nonweight Bearing): Demonstration of a System of Exercises with Exercising Apparatus for the Arthritic (Motion Pictures), Charles H. McEnerney, M.D., F.A.C.P.; Practical Application of Obstetric Devices Invented by the Exhibitor—The Department of Obstetrics, Georgetown University School of Medicine, J. Bay Jacobs, M.D., F.A.C.S.; Stained Bacilli in the Tissues of a Case of Experimental Anthrax, George J. Brilmyer, M.D.; (a) Fresh Tissue Exhibit—Sibley Hospital, (b) Hormone Test, Oscar B. Hunter, M.D.; A Mendelian Query, Herbert H. Schoenfeld, M.D.; Pneumococcus Pneumonia, Harry F. Dowling, M.D.; Various Phases of Oral Surgery, Sterling V. Mead, D.D.S., Howard J. Newton, D.D.S., and Daniel F. Lynch, D.D.S.; Apparatus and Methods of Preventing Death by Asphyxia—The Society for the Prevention of Asphyxial Death, Sollie Katzman, M.D.; Gastroscopy with the Flexible Gastroscope: Actual Views of the Interior of the Stomach, R. Lyman Sexton, M.D., and David Davis, M.D.; Demonstration of Gallbladder Cases, Fred A. J. Geier, M.D.; Peroral Endoscopic Instruments. Foreign Bodies Removed, Pathology of the Bronchi and Esophagus,—Bronchoscopic Clinic, George Washington University Hospital; Tuberculosis: Slides, Specimens, etc.—The Tuberculosis Hospitals, J. Winthrop Peabody, M.D.; Whole Organ Sections, Gross and Microscopic—The Departments of Pathology and Surgery, Georgetown University School of Medicine, Eugene R. Whitmore, M.D.

Surgical Dry Clinics will be given on the following subjects:

"Intestinal Obstruction Caused by Gall Stones," George K. Nutting, M.D.; "Diabetic Gangrene Plus Welch Bacillus Infection," J. Ogle Warfield, Jr., M.D.; "Carcinoma of Submaxillary Gland," W. Warren Sager, M.D.; "Unusual Foreign Body in the Sigmoid," Benjamin F. Dean, Jr., M.D.; "A Method of Treating Carbuncles," E. Osmun Barr, M.D.

No member can afford to miss these interesting meetings. Invite your medical friends from the neighboring states. There will be a complimentary Mayflower Luncheon at noon, Wednesday, May 6, to all registrants. A Banquet for which reservations may be made *now* with Dr. Edmund M. Ellerson, 1726 Eye Street, N. W., will be held Thursday, May 7, at the Mayflower Hotel, 7:30 P.M. Ask to see the floor plan.

NEWS AND PERSONALS

The Louis Mackall Society met at the University Club on Tuesday, March 10. The Program:

1. "Colles' Fracture." Edward Kelly, M.D.
2. "A Venereal Disease Control Program for the District." Russell J. Fields, M.D.

The Washington Ophthalmological Society met on Monday, March 2, 1936, at 7:30 P.M. at the Episcopal Eye, Ear and Throat Hospital. The program:

1. Case Report. Captain Ross T. McIntire, U. S. N.
2. "Retinoblastoma." Major Raymond O. Dart.
3. "Uveitis with Secondary Glaucoma Accompanying Spontaneous Absorption of the Crystalline Lens." Robert H. Courtney, M.D., Richmond.
4. "Retinitis Pigmentosa." Louis S. Greene, M.D.

The Smith-Reed-Russell Series of Lectures of the George Washington University School of Medicine included, on March 17, "The Philosophic Background of Medicine," by Henry E. Sigerist, M.D., of the Institute of the History of Medicine, Johns Hopkins University.

The American College of Physicians met in Detroit, March 2 to 6. Wednesday, March 4, was spent at Ann Arbor. Clinics at the University Hospital occupied the morning. Formal papers were read during the afternoon in the auditorium of the students "Union." Drs. William M. Ballinger, Clapham P. King, and John A. Reed, following their election, became Fellows of the College. Registrants from the Medical Society of the District of Columbia were: Drs. W. M. Ballinger, John R. Cavanagh, C. B. Conklin, Samuel Dessoff, Clapham P. King, M. J. McInerney, William Gerry Morgan, W. F. O'Donnell, John A. Reed, and Wallace M. Yater. The newly elected officers of the College are: Drs. Ernest B. Bradley, Lexington, *President;* James H. Means, Boston, *President-elect;* William J. Kerr, San Francisco, *First Vice President;* David P. Barr, St. Louis, *Second Vice President;* Edgerton L. Crispin, Los Angeles, *Third Vice President;* William D. Stroud, Philadelphia, *Treasurer;* William Gerry Morgan, Washington, *Secretary-General.* Mr. E. R. Loveland, Philadelphia, is the *Executive Secretary.*

The American Association on Mental Deficiency composed of some 500 educators, psychologists, sociologists and psychiatrists is holding its sixtieth annual meeting at the Hotel Jefferson, St. Louis, Mo., on May 1–4. Some of the speakers are: Popenoe on "Sterilization," Goddard on "Social Security," Hincks on "A National Program," Kirkbride on "Public Welfare," Hackbusch on "Social Service," Vanuxem on "Education," Berry on "Teaching Technics," Humphreys on "Research Problems." Everyone interested in the mentally defective or retarded child is cordially invited to attend these sessions. The complete program may be obtained from the Secretary, Dr. Groves B. Smith, Godfrey, Illinois.

William Holland Wilmer, M.D., LL.D.
(1863-1936)

On March 12, 1936, passed Dr. William Holland Wilmer, who held membership in the Medical Society of the District of Columbia since 1890. Throughout his career as an outstanding ophthalmologist he was acclaimed by those of highest station, as well as by those most lowly, for his skill and kindly qualities. His public service began with a commission as First Lieutenant, Medical Reserve Corps, United States Army, in 1911. His career as a member of the Medical Corps in France and later, with the attained rank of Brigadier General in the Reserve Corps, is recorded in the archives of the United States Army with distinction. He was surgeon in charge of the Medical Research Laboratory, A. E. F., in 1918. In 1924 he was given the Commander of Legion of Honor Medal. A valuable contribution to the history of the recent conflict was his "Aviation Medicine in the A. E. F.," 300 pp., published by the Government Printing Office, February, 1920. A living personal tribute is in the form of the

William Holland Wilmer, M.D., LL.D. (1863–1936)

Wilmer Ophthalmological Institute, Johns Hopkins Hospital, with its $6,000,000.00 endowment. His wide connections, with thousands of appreciative patients, made all this possible. The formal dedication of the Institute took place on October 15, 1929.

At the termination of his service in New York Hospitals in 1889, where he was lecturer in ophthalmology at the New York Polyclinic Hospital, and attending ophthalmologist to Bellevue Hospital Out-door Department, he came to Washington. In doing so he is quoted as saying it was from a strong personal desire. The love of Washington was maintained throughout his life. A founder of the Episcopal Eye, Ear & Throat Hospital, District of Columbia, and Professor of Ophthalmology at Georgetown University, he brought attention to Washington and its profession from afar. Georgetown University conferred upon him the degree of LL.D. In commemoration of the 144th anniversary this university, in 1933, through its president, Dr. W. Coleman Nevils, with formal ceremony presented to Dr. Wilmer the Secchi Academy Medal. The Archives of Ophthalmology dedicated its entire January, 1934, issue to Dr. Wilmer. His contributions not only to medical science and its literature, but to social science through his service as a churchman of the Episcopal denomination, are legion. The medical profession of Washington will, through a committee consisting of Drs. A. L. Stavely, Chairman, Robert W. Baker and Louis S. Greene, arrange a formal tribute.

VENEREAL DISEASE INFORMATION

The United States Public Health Service prepares for distribution to the medical profession throughout the United States VENEREAL DISEASE INFORMATION, a monthly publication. It measures approximately 6 by 9 inches and ranges in size from 25 to 75 pages. It is the purpose of the Public Health Service in issuing this publication to provide in condensed form a monthly summary of the scientific developments in the diagnosis, treatment and control of syphilis and gonorrhea. More than 300 American and foreign journals are reviewed for this work. Abstracts are made of articles describing laboratory, pathologic and clinical work in the field of venereal diseases. The most important literature on every phase of the subject is presented in the form of brief abstracts that are easily read. An index for the year is published with the December issue. During the past year thousands of physicians found this publication useful in enabling them to keep abreast with developments in venereal disease work. The cost of this publication is fifty cents (50¢) per annum, payable in advance to the Superintendent of Documents, Government Printing Office, Washington, D. C. It is desired to remind the reader that this nominal charge represents only a very small portion of the total expense of preparation, the journal being a contribution of the Public Health Service in its program with State and local health departments directed against the venereal diseases. If you wish to secure the valuable service which this monthly magazine provides, send fifty cents (50¢) to the Superintendent of Documents, Government Printing Office, Washington, D. C

MOTHER'S DAY, MAY 10, 1936

The Maternity Center Association,[1] 1 East 57th Street, New York City, is carrying on throughout the year an effort to develop in every community a group of civic leaders interested in and willing to work for the provision of good care for every pregnant mother. The climax of each year's campaign occurs during the week preceding Mother's Day when the Association urges each of these local groups to hold a special meeting to consider and evaluate the maternity services available in their community. In all of its communications to local groups the Association stresses the fact that the provision of adequate maternity care is basicly a medical problem and all successful efforts must be carried on with the support and guidance of the profession. A sample of the literature follows:

Every Husband Should Provide for His Wife
The Services of a Competent Doctor or Qualified Hospital
That She Will Have:

1. A complete physical examination early in pregnancy followed by treatment that is indicated.
2. A dental examination early in pregnancy and the care that is needed.
3. Medical and nursing supervision, care and instruction throughout pregnancy.
4. Attention to any problem that may affect her health or disturb her peace of mind.
5. A place of confinement that will provide both comfort and safety that the delivery may be conducted with the least chance of accident or infection.
6. Supervision, care and instruction after delivery until she is able to resume her usual activities and to carry the added responsibility of a new baby.
7. Postpartum examinations one, two and three months after delivery.
8. Arrangements for health supervision of the baby and for such further care as she may need.

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[1] A "Kit of Helps" for organizing Mother's Day meetings is available. Dr. George W. Kosmak is chairman of the Medical Board.

CHILD HEALTH—THE NATION'S WEALTH

May Day—Child Health Day was inaugurated in 1924 by the American Child Health Association for the purpose of calling the attention of parents, communities and the public in general to the need for measures to protect the health of children. The slogan for 1936 is *Child Health—The Nation's Wealth: Build Good Teeth—Protect Them.*

Emphasis this year will be stressed on the proper development and prophylactic care of teeth. Ample facilities will be provided to gain the objective. In addition, attention will be drawn to the tuberculosis problem and the furtherance of the diphtheria immunization program. Radio talks will be given on the use of toxoid. The General Committee—May Day Campaign, of which Dr. Hugh J. Davis is chairman, is planning to display to the parents for educational purposes in the auditoriums of the various High Schools, motion pictures on child development, tuberculosis and social hygiene. The whole campaign is an educational program to impress the public with the need for medical, dental and nursing supervision, and to show where they may obtain that supervision from private sources if possible, otherwise through the expenditure of public funds.

DISEASES OF THE NERVOUS SYSTEM

(*Continued from page 79*)

In most cases direct injection into the ventricles is advisable rather than injection in the lumbar subarachnoid space. Following this, stereoscopic X-ray plates should be taken and carefully studied. In the majority of cases the location of the tumor will be betrayed by various deformities of the ventricular system and by filling defects of the ventricles. More recently thorium dioxide or Thorotrast has been recommended as a contrast agent in lieu of air and certainly appears to give magnificent pictures. It may, however, not be entirely without danger, and its definite applications and sphere of usefulness still remain to be determined.

Simple X-ray films of the skull may be expected to demonstrate 3 types of change often indicative of tumor. These are separation of sutures, generalized or localized thinning of the skull, and calcification within tumor masses.

Meningioma. This type of tumor is diagnosed principally on the long history of focal disturbance and occasionally by X-ray evidence of involvement of the skull or calcification within the tumor. It is often impossible to differentiate meningiomas from slow-growing astrocytomas.

Metastases. The evidence of multiple lesions associated with signs of increased intracranial pressure is suggestive. If combined with signs of tumor elsewhere it is practically diagnostic.

Other Types of Neoplasm. The pituitary adenomas may be diagnosed by the clinical symptoms of bitemporal hemianopsia and hyper- or hypopituitarisms along with X-ray evidence of destruction or deformity of the sella turcica.

The acoustic neurinomas give a history of tinnitus, deafness and trigeminal- and facial-nerve involvement along with clinical evidence of disturbance of these 3 cranial nerves, often combined with cerebellar and vestibular signs.

The craniopharyngiomas are suggested by the combination of the youth of the patient, sexual infantilism and bitemporal field defects.

Blood-vessel tumors are difficult to diagnose clinically, the most important signs being focal convulsions and an audible bruit.

Tumors of the spinal cord (usually gliomas and meningiomas) give rise to signs of cord compression at definite levels with blockage of cerebrospinal fluid circulation and positive Queckenstedt tests. Signs of infection, trauma or hemorrhage are absent. It is usually impossible to distinguish intramedullary from extramedullary tumors.

TREATMENT OF NEOPLASTIC DISEASES

Successful treatment of cerebral neoplasms depends very largely upon early diagnosis. The treatment itself is usually that of surgical extirpation, occasionally irradiation. As a general rule, slowly-growing astrocytomas, meningiomas, pituitary adenomas and craniopharyngiomas have a hopeful prognosis if not too far advanced. The glioblastomas and medulloblastomas, once definitely identified at operation, are usually not amenable to surgical but sometimes respond well to X-ray treatment. The acoustic neurinomas are extremely favorable risks if attacked early, but once they have attained a large size and involve the brain stem and cerebellum, operation becomes a much more serious proposition and the outlook much less hopeful.

(*To be continued*)

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MALIGNANT DIPHTHERIA

REPORT OF 8 CASES TERMINATING IN DEATH AND 1 CASE TREATED EARLY AND EFFICIENTLY WITH RECOVERY; A PLEA FOR EFFORTS TOWARD PROPHYLAXIS, EARLY DIAGNOSIS AND ADEQUATE TREATMENT

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Malignant diphtheria is an extraordinarily severe form of the disease which, although fortunately uncommon, still occurs with sufficient frequency to be recognized as a disease entity. My purpose consequently in reporting these cases is not merely to reiterate the signs and symptoms of a diphtheritic syndrome which is so universally recognized but rather to attempt to place before the local medical group a series of 8 deaths from a disease which is and should be an entirely preventable one.

Malignant diphtheria may be defined as an acute fulminating infection of the upper respiratory tract caused by the Bacillus diphtheriae in intimate association with certain strains of streptococci. The infection seems to originate in the nasopharynx, extends rapidly into the nasal cavity, then involves the tonsils, pharynx and uvula, with the formation of a thick, greyish, foul-smelling membrane associated with signs of overwhelming intoxication, circulatory failure and more or less sudden death. Two almost invariable signs which tend to appear early and should aid in early diagnosis are: (1) The appearance of a serous or serosanguineous nasal discharge which tends to excoriate the nose and upper lip, and (2) the rapid and early development of enlarged cervical lymph nodes with an associated "toxic cellulitis" and edema of the soft tissues of the neck giving rise to the so-called "bull-neck." The degree of "bull-neck" formation bears a direct ratio to the degree of the intoxication.

REPORT OF CASES

Case 1: J. M., a colored male, aged 11 years, developed a sore throat and cold with considerable discharge from the nose on October 6, 1935. The condition became progressively worse, and the child was admitted to Gallinger Municipal Hospital on the eighth after having been examined in a hospital outpatient department. Physical examination on admission showed an acutely ill child whose temperature was 104°F. and whose pulse rate was 120. There was considerable discomfort in breathing due to a profuse nasal discharge. The nose and lip were markedly excoriated and the breath was foul. Tonsils, pharynx and soft palate were covered with a thick, dirty, greyish membrane. Marked edema of the neck was present, the cervical glands were discretely enlarged, and swallowing was difficult and accompanied by nasal regurgitation. Twenty thousand units of antitoxin were administered intravenously and 20,000 units intramuscularly. On October 14 his condition was satisfactory; the swelling and edema of the neck were much reduced. A note made by the attending resident physician on the fifteenth stated, "The patient was examined by me at 11 A.M. His physical condition appeared satisfactory and there was no evident cardiac weakness. He was taking fluids well and appeared better. At about 11:20 A.M. the child sat up in bed to take fluids and fell back dead."

Case 2: R. B., a colored female, aged 3 years, had had a cold and sore throat on December 2, 1935. The next day the neck became swollen. She was seen by a health department physician on the fourth and sent to Gallinger Municipal Hospital. Physical examination on admission revealed the temperature to be 104°F. and the pulse rate to be 130. There was considerable serosanguineous nasal discharge with excoriation of the nose and upper lip. The tonsils, pharynx and soft palate were covered with a thick, foul-smelling membrane which bled profusely on the slightest pressure. The neck presented the typical "bull-neck" appearance. Twenty thousand units of diphtheria antitoxin were administered intravenously and 20,000 units intramuscularly. The child seemed to hold its own, took fluids freely, and the pulse remained strong and regular. She died suddenly at 6:10 A.M. on December 5, 14 hours after admission.

Comment. These 2 cases are very interesting from the standpoint of immediate cause of death. This was not unexpected. Experience with this type of diphtheria has taught us to expect death at any moment.

Case 3: R. D., a white male, aged 7 years, developed a sore throat on November 17, 1935. This failed to improve, and on the nineteenth the left side of the neck became markedly swollen, the right less so. He was seen on the evening of the twentieth by an intern in an outpatient department. A diagnosis of peritonsillar abscess was made, and the patient was referred to Gallinger Municipal Hospital. Physical examination on admission showed an acutely ill child, with a temperature of 101°F. and a pulse rate of 120. There was considerable serous nasal discharge with excoriation of the nose. A dirty, greyish, foul-smelling membrane was present over the tonsils, uvula and soft palate. The neck showed discrete enlargement of the cervical glands with surrounding swelling of the entire neck. There were no signs of laryngeal obstruction. The heart sounds were regular, rhythmic and of good quality. Twenty thousand units of diphtheria antitoxin were administered intravenously and 20,000 units intramuscularly. Improvement over the next 5 days was satisfactory. However, during the day of November 26 the child became much weaker, and the heart action was rapid and irregular, ending in sudden death at 6 A.M. the next day.

Comment. The differential diagnosis between malignant diphtheria and peritonsillar abscess is often very difficult. It must be made early. The presence of a nasal discharge with excoriation, usually a lower temperature, more pronounced signs of toxemia, beginning toxic cellulitis of the neck which tends to be bilateral from the onset and which on pressure has a characteristic doughy feel tending to pit, and the presence of a membrane or thick tenacious exudate on the postpharyngeal wall opposite the soft palate all point to the diagnosis of diphtheria.

If one waits for reports of positive culture, development of a membrane or "diphtheric odor," irreparable damage will be done by the diphtheria toxin, and the patient's prognosis is poor. All cases of suspected peritonsillar abscess should be cultured, and if there is any question of doubt antitoxin should be administered in large doses (40,000 to 60,000 units), pending culture reports and clinical observation of the throat from hour to hour.

Case 4: J. K., a white male, aged 9 years, was taken ill on November 20, 1935, with fever, nasal discharge and swelling about the neck. A physician was called who made a diagnosis of tonsillitis. The next day he was again seen and a new diagnosis of mumps was made. Two days later another physician was called who took a culture of the throat and sent the child to Gallinger Municipal Hospital. On admission on the thirtieth at 4:15 P.M., physical examination revealed the temperature to be 103°F. and the pulse rate to be 160; the pulse was barely perceptible. He was semicomatose but could be aroused and seemed well oriented. There was a profuse serosanguineous discharge with excoriation and crusting about the nose and upper lip. The entire throat was covered with a thick, foul-smelling, greyish membrane. The neck was markedly swollen throughout and presented a purpuric mottling. Palpation demonstrated the characteristic doughy feel with pitting on pressure. There was considerable sub- and suprasternal retraction. Auscultation of the chest elicited breath sounds only faintly. Aspiration of the nose and throat did no good. Intubation was performed without improvement. The tube was removed and aspiration again resorted to which resulted in considerable relief being obtained. Hemorrhage from the nose and throat was checked by local application of adrenalin. During the next few hours the child seemed to improve. Thirty thousand units of antitoxin were administered intramuscularly and 20,000 units intravenously. Death occurred on December 1 at 4 A.M., 12 hours after admission.

Comment. This is an example of pure lack of knowledge as to the clinical manifestations of diphtheria or mumps. The diagnostic question between these diseases could never have arisen had the throat been carefully examined and the cause of the bloody nasal discharge sought.

Case 5: E. C., a white female, aged 25 years, became ill on December 5, 1935, with a sore throat. She treated herself for 2 days without improvement and then went to a dispensary from which she was referred to Gallinger Municipal Hospital. Physical examination on admission at 7:45 P.M. on December 7, 1935, revealed the temperature to be 100°F. and the pulse rate to be 90. There was a profuse serosanguineous nasal discharge with excoriation of the nose and upper lip. The tonsils, uvula and soft palate were covered with a thick, dirty grey, foul-smelling membrane; the neck showed marked swelling which extended down over the anterior chest wall. Breathing was difficult and labored, but there were no signs of laryngeal obstruction. The heart action was regular but of poor quality. The pulse was weak and barely perceptible. Thirty thousand units of antitoxin were administered intravenously and 20,000 units intramuscularly. Death was relatively sudden at 8 A.M. on December 8, approximately 12 hours after admission.

Comment. This case brings home the fact that adults as well as children are susceptible to this type of diphtheria, and the prognosis just as poor.

Case 6: C. S., a white male, aged 8 years, awoke on December 15, 1935, with a cold. The next day he was seen by a private physician. On the seventeenth a health-department culture was taken and 5,000 units of diphtheria antitoxin given intramuscularly. On the eighteenth the culture report was positive and 10,000 units were given intramuscularly. The child's condition became progressively worse, and he was sent to Gallinger Municipal Hospital on December 20 at 3:15 P.M. Physical examination showed a markedly toxic child with a temperature of 100°F. and a pulse rate of 96. He was semicomatose with some laryngeal obstruction as evidenced by croupy cough, suprasternal retraction and impaired transmission of breath sounds. There were marked excoriation and edema of the upper lip, edema of the face and lateral sides of the neck and a sanguinopurulent discharge from the nose. Profuse membrane formation was noted over the soft palate, tonsils and pharynx. The heart action was regular and of good quality. Twenty thousand units of antitoxin were administered intravenously and 20,000 intramuscularly. During the succeeding 4 days the child seemed to improve except for repeated attacks of vomiting. The edema of the face and neck subsided and there was marked improvement in the condition of the pharynx and tonsils with almost entire disappearance of the membrane. The heart action was rapid, regular and of good quality, and the chest remained clear. Vomiting continued. Death took place suddenly on December 26 at 1 P.M.

Comment. This case amply demonstrates the effects produced on the heart and nervous system when insufficient antitoxin has been administered in the early stages of the disease. Had one large dose been given this child at the beginning of the infection, I feel certain he would have survived. Clinical evidences of diphtheria had almost entirely disappeared at the time of death.

Case 7: J. F., a white female, aged 9 years, was first seen by a physician 4 days before admission. Her complaint at that time was fever and sore throat. A diagnosis of streptococcus sore throat was made and symptomatic therapy advised. However, a health-department culture was taken which was reported next day as negative. The child was not isolated despite the physician's advice. The next day telephone report to the doctor stated that the child was improved. She was seen again on the twenty-fourth, at which time she was found to be toxic and had swelling of both sides of the neck with considerable exudate over the pharynx and tonsils. On the twenty-fifth there was no improvement; the temperature was elevated, and the child seemed very toxic. She was sent to Gallinger Municipal Hospital as clinical diphtheria. On admission the temperature was 102.6°F. and the pulse rate 160. The child was resting fairly comfortably in bed and wanted to sit up. Slight membrane formation was noted in the anterior nares. The mouth was opened with difficulty, and a foul-smelling, greyish membrane was seen extending over the soft palate, uvula and tonsils, occluding the pharynx. Mere pressure of the tongue blade over the membranous area produced bleeding. There was moderately tense swelling over the entire neck. Absolutely no evidence of laryngeal obstruction was present. The heart action was rapid, regular and of poor muscular quality. Forty thousand units were administered intravenously and 20,000 units intramuscularly. On December 26 her condition was poor and she was markedly cyanotic. The heart action was irregular and the pulse barely perceptible. Additional antitoxin was administered, 60,000 units intramuscularly and 20,000 units intravenously being given. The quality of heart action seemed to improve during the next 24 hours. On the evening of the twenty-seventh there was a sudden change for the worse, and death ocurred at 1 A.M. that night.

Case 8: N. S., a white male, aged 13 years, was taken ill some 36 hours prior to admission. He complained of fever and sore throat. On examination the suspicion of peritonsillar abscess was aroused. A health-department culture was taken. In the forenoon of December 26, 1935, he seemed toxic, and there was considerable swelling on the left side of the neck, dysphagia, and an excoriating nasal discharge. Report on the culture was positive for diphtheria. He was given 10,000 units of diphtheria antitoxin intramuscularly and sent to Gallinger Municipal Hospital. On admission the temperature was 101.6°F. and the pulse rate 100. He was markedly restless and expectorated considerable amounts of brownish mucopus. The conjunctivae were congested, and there was a profuse seropurulent discharge from the nose with marked excoriation about the nose and upper lip. The soft palate, tonsils and uvula were covered with a putrid, greyish membrane. The pharynx was not visible. There was marked swelling of the left side of the neck, less marked on the right. No evidence of laryngeal obstruction was present. The heart action was regular and rapid, and the muscular quality seemed good. The skin showed an urticarial rash which was undoubtedly a delayed serum reaction from the antitoxin administered earlier in the day. During the 6 hours following admission the patient was given 40,000 units of antitoxin intravenously and 110,000 units intramuscularly in divided doses preceded by small amounts of epinephrine subcutaneously. Cyanosis and restlessness became more marked, the patient was unable to swallow, the heart action became progressively more feeble, and death took place at 9 P.M. on December 27.

Comment. It was suggested to me that larger doses of antitoxin be used on the basis of the poor results in the previous cases. I have as yet to obtain a recovery once a pronounced "bull-neck" has developed. Therefore, case 8 was given a total dosage of 140,000 units and case 9 a total dosage of 160,000 units of antitoxin.

Case 9: H. P., a white female, aged 10 years, was in the same institution as cases 7 and 8 and had been in intimate contact with both children. On the morning of December 27, 1935, she developed a sore throat with fever. A culture was taken and she was sent to Gallinger Municipal Hospital. On admission her temperature was 103°F. and her pulse rate 120. A fairly heavy purulent nasal discharge was noted but there was no evidence of excoriation of the nose and upper lip. Her throat was angry and edematous, and considerable thick tenacious mucus was seen high up on the pharyngeal wall. There was little, if any, edema of the neck. Twenty thousand units of antitoxin were administered intravenously and 20,000 units intramuscularly. On the twenty-eighth the culture report was positive. Convalescence was uneventful and uncomplicated.

Comment. This case certainly demonstrates the efficacy of large doses of antitoxin when administered in the earliest stage of the disease.

An unusual feature about this group is that there was comparatively little laryngeal obstruction; there was no evidence of pneumonia on examination; dyspnea, present in all the cases, undoubtedly was myocardial in origin.

The treatment of these children was directed toward combating myocardial failure and the severe intoxication. Large doses of antitoxin were administered intravenously and intramuscularly; small transfusions were given, when time allowed; fluids were given by mouth when swallowing was unimpaired, otherwise by retention enema and hypodermoclysis; oxygen was used for cyanosis. The response to repeated intravenous injections of 25 to 50 cc. of 50 per cent glucose solution was prompt and efficacious, but transitory. Phenobarbital and small doses of codeine and morphine were of aid in combating restlessness. Special nursing care was obtained and is certainly an important essential.

Despite all these measures, however, death resulted in 8 cases, demonstrating the hopelessness of the situation once the malignant condition appears.

A short time ago I heard an older physician speaking to a mother, when questioned concerning the value of prophylactic injections against diphtheria. His answer was, "I don't believe in that foolishness; if your child gets diphtheria I'll give him some shots of antitoxin and he will be all right." It is such attitudes as this on the part of physicians; failure of education of the lay public as to the value of prophylactic immunization; failure to make an early diagnosis and give adequate antitoxin that allow such a condition as malignant diphtheria to develop. What must be done to prevent not only this form but any form of diphtheria is a problem for every physician.

Our efforts must first be directed toward prophylaxis. The value of toxoid or toxin-antitoxin injections is unquestioned. Schick-testing should not only be carried out on infants and younger children, but also periodically in older children and adults. When people are taught that diphtheria immunization is as important as vaccination against smallpox, the incidence of diphtheria will be materially reduced. All doctors should carry, or have available, means for throat and nose culture. A recent method brought out by Solé allows bacteriologic diagnosis of diphtheria in from 2 to 4 hours. Prompt diagnosis and early administration of large doses of antitoxin will prevent malignant diphtheria.

At present, with the concentration of communicable diseases at Gallinger Municipal Hospital, only the nurses and interns at that institution are given training in the diagnosis and management of diphtheria. Other cities have provisions for the training of nurses and interns of other hospitals in the communicable disease hospital of the city.

A vigorous campaign toward education of the public and medical profession regarding the prophylaxis and treatment of diphtheria certainly seems indicated. Only then will such a fatal problem as malignant diphtheria be solved.

SUMMARY

1. Eight cases of malignant diphtheria with death have occurred in Washington during the period from October 12, 1935, to December 27, 1935. These cases are reported.

2. One patient, in intimate contact with 2 of those reported, was treated early with large doses of antitoxin and had an uneventful recovery.
3. Two important diagnostic signs are:
   (a) Serous or serosanguineous nasal discharge with excoriation of the nose and upper lip.
   (b) Toxic edema of the soft tissues of the neck.
4. Doses as great as 160,000 units of antitoxin are of no avail once the condition has developed.
5. A plea is made to the physicians of Washington for more earnest effort in the education of the profession and laity in the prophylaxis and treatment of diphtheria.

CERTAIN CLINICAL ASPECTS OF VITAMIN B DEFICIENCY*

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The clinical manifestations of vitamin B deficiency in man vary with the number of components involved and their concentrations in the various tissues. The number of vitamin B components continues to increase as new attempts at fractionation are successful. At present the success of fractionation depends almost entirely upon clinical observation, because the substances are only recognized by their effects when added to or withheld from vitamin-free or vitamin-deficient diets. For the most part rats have served as the experimental subjects, and since the interrelations of the various fractions are so complex many observations made upon humans in the clinic are best interpreted by reference to the processes which occur in the rat.

One of the first manifestations in this animal of a vitamin B-deficient diet is the development of the dermatitis first described by Goldberger and Lillie in 1926. During the intervening years changes in rate of growth have been accepted as additional criteria of the vitamin B effects.

Of the skin changes two kinds are described, an (a) type of dermatitis involving the forepaws, hindpaws and ears which may spread later over the limbs and trunk with cracking and desquamation of the skin, and a (b) type with shedding of the fur in patches and a matting and staining of the fur which remains, together with sunken eyes and sore and swollen eyelids.

Addition of vitamin B extract to the basal diet (depending upon the reserve supply of vitamin B complex in the body of the animal at the time of beginning the diet) results immediately or after a short interval in cessation of growth, and the appearance of the dermatitis (Chick, György). If pure lactoflavin, a water-soluble pigment, or hepatoflavin is added to the vitamin B-free diet there is a slight stimulating effect, not particularly significant, upon growth. As regards the dermatitis this same diet does not exert a curative effect but rather in some instances seems to cause it. If to the vitamin B-free diet the supplemental factor (also called the pellagra preventive factor or vitamin B6 fraction) from yeast is added together with flavin, normal growth is resumed by the rat. The dermatitis meanwhile undergoes a rapid cure. If, finally, supplemental factor alone is added to the basal diet there is no consistent cure of the dermatitis nor is there any resumption of growth.

Several additional observations are important as regards possible action of the same mechanism in man. The first is the fact that the nature of the carbohydrate in the basal diet of the rat influences the production of dermatitis by the flavin. Maize sugar in the basal diet plus flavin produces much more frequently a florid dermatitis than does rice starch. In this connection it is interesting to recall that Goldberger's work with vitamin B-deficient diets in humans included maize. Second, vitamin B6 has a definite counteracting action toward flavin, in that if given after flavin has produced a dermatitis in the rat vitamin B6 exerts a curative action, while when given with flavin the latter either produces no dermatitis or only a mild dermatitis.

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*Read before the Section on Internal Medicine, December 6, 1935.

Clinical observations in other species have resulted in less well defined conclusions as regards individual fractions of the vitamin B complex, but the results are as interesting and as important as in the rat. Cowgill has worked extensively with the dog as have Miller and Rhoads. The latter also in maintaining swine on a diet deficient in vitamin B complex (for dogs, not for rats) have noted a macrocytic type of anemia in the swine, together with an absence of intrinsic substance from the gastric contents.

In humans, experimental clinical observations have been made by Elsom and her co-workers. Elsom's first patient, a 56-year-old female, was hospitalized for approximately 1 year, during which time dietary intake was varied from a vitamin B complex-deficient diet to the same diet plus various B components. The symptoms while the patient was on a deficient diet were as follows: Moderate amount of asthenia; severe sore tongue; severe anorexia; severe epigastric distress; marked constipation; frequent paresthesias; lowered average temperature; smooth tongue; pronounced edema; exaggerated reflexes and lost vibratory sensation. When vitamin B1 was added to the diet improvement was noted in the asthenia, pains in the extremities, paresthesias, pallor, ecchymosis and edema. When vitamin B2 (prepared from egg white) was administered in addition to vitamin B, there was additional improvement in the tongue to a practically normal condition and in the constipation, and less exaggerated reflexes were present.

Elsom's second case was studied over a much shorter period of time, so that the efforts of prolonged subtraction from or addition to the diet of the various members of the vitamin B complex was not possible as in the first case.

Of our 2 reported cases, the first occurred in association with disease of the gallbladder, while the second occurred in a patient with a sprue-pernicious anemia type of disturbance; a brief resume of the histories will be given. Our first patient, a 58-year-old white female, had experienced at intervals during 14 years, attacks of abdominal pain. Appendectomy did not relieve the attacks which were characterized in addition to abdominal distress, by pain, anorexia and jaundice, the latter upon one occasion only. An increase in malaise and anorexia was responsible, in the spring of 1934, for a limitation of diet to fruits and vegetables with chicken and meat only occasionally. Several months later there appeared a small red spot in the palm of the left hand, followed soon by a similar lesion on the dorsum of the right foot. Skin changes gradually become more marked and included drying, cracking and scaling of the skin. At intervals there appeared also a feeling of lameness and numbness in the right leg, and during one period of marked exacerbation in symptoms, reddening with subsequent pigmentation of the ventral surfaces of the lower third of each forearm and in the antecubital fossae occurred.

Our second case, a 52-year-old white female, at one time presenting the symptoms and physical and laboratory findings of sprue, later developed a macrocytic type of anemia, at which time liver extract administration produced a very satisfactory response. Several months after discharge from hospital there appeared together with a wrinkling and slight loss of elasticity in the skin of the forearms, a moderate degree of brownish diffuse pigmentation extending from the wrists to the midforearm regions. Following the administration of vitamin B substances this change in the skin has regressed to a moderate degree, but, even as do the bulky stools and occasional diarrhea, it persists even at present.

Observers who have studied the smooth tongue in particular have found a response upon its part to vitamin B therapy (Lewis, Gerstenberger) either in cases with or without pernicious anemia. In addition, Strauss and Castle have brought, by identifying the extrinsic substance of pernicious anemia as either vitamin B2 (G) or a substance closely related to it, the various components of the vitamin B complex into relationship with previously well defined clinical disturbances.

Thus the symptoms of vitamin B deficiency are both varied and numerous. Anorexia and epigastric distress are probably the first to appear, and these undergo exacerbations and remissions during the early period of the disease. The sore tongue usually appears after the anorexia and other gastro-intestinal symptoms are well established. At intervals, during the exacerbations, paresthesias and anesthesias occur relatively early in the disease. Later, together with the appearance of positive neurological findings on physical examination, the severity of subjective symptoms seems decreased. Skin manifestations usually occur after the deficiency disease has been present for some time.

The pathogenesis of the symptoms and tissue changes, intimately related to the amount of vitamin B substances available to the tissues, is of necessity also markedly influenced by conditions in the gastro-intestinal tract. Strauss and others have discussed the rôle of the gastro-intestinal tract in the production of sprue, pellagra and pernicious anemia; and in vitamin B deficiency the gastro-intestinal tract likewise plays an important rôle. In our first case, in addition to restriction of diet, there was frequent hurrying of food through the intestinal tract by repeated catharsis, a measure which relieved the discomfort incident, in part at least, to the chronic cholecystitis. In our second case the marked gastro-intestinal derangement caused defective absorption, a condition which, even now with the patient apparently well, is shown to persist by the low blood sugar-tolerance curve, the sugar being given by mouth. A second factor in producing clinical manifestations of vitamin B deficiency noted only recently by György is the production of cutaneous, if not other lesions also, by disproportion in the amount of intake of certain of the vitamin fractions. In our second case this type of disturbance would seem to account for the appearance of the characteristic skin lesions which occurred while the patient was receiving liver extract intramuscularly. As shown by Guha, both commercial liver extracts and stomach preparations contain vitamin B2. With adequate doses of liver extract, which doses must, in the light of recent B2 fractionation, contain large amounts of hepatoflavin, the skin lesion may well have been produced by the excess intake of hepatoflavin. Further evidence for this view is the fact that since beginning administration of what we now may identify as the Y-factor or the vitamin B6 fraction, in the form of Brewer's yeast, there has been gradual regression in the skin changes. In passing, an additional interesting clinical implication of György's work is his having received the impression that experimental vitamin B deficiency in rats presents many features of "pink" disease of infants.

As regards therapeutic management of cases of vitamin B deficiency, there is one agent to which the patient responds readily, namely, Brewer's yeast. All of the known or as yet suspected vitamin B fractions are contained therein, and response of the patient is usually rather prompt and generally gratifying. It is perhaps well to give all the components in excess, with the exception that this excess be in the form of Brewer's yeast rather than a fraction or fractions high in flavins. Fractions of the latter, however, are not to be confused with foods high in flavin content. Such foods (liver, kidney) are the ones found by Whipple and Robschiet-Robbins to produce most rapid and complete regression of nutritional anemia of dogs and are the ones which are exceedingly useful in the macrocytic types of anemia of man.

In conclusion, whether or not our interpretation of changes as they occur in patients is correct, the analogies being open to criticism in that in part they are drawn from experimental clinical work with the rat, remains for future confirmation or rejection. Certainly, the clinical observations made thus far indicate in both the rat and man a complex interrelationship of the various fractions and a far reaching metabolic significance of the members of the vitamin B complex.

BIBLIOGRAPHY

Chick, H., Copping, A. M., and Edgar, C. E.: The Water-soluble B-vitamins; the Components of Vitamin B2. Biochem. J., 1935, **29**, 722.

Cowgill, G. R.: The Vitamin B Requirement of Man. New Haven, Yale University Press, 1934.

Elsom, K. O.: Experimental Study of Clinical Vitamin B Deficiency. J. Clin. Investigation, 1935, **14**, 40.

Gerstenberger, H. J.: The Etiology and Treatment of Herpetic (Aphthous and Aphtho-ulcerative) Stomatitis and Herpes Labialis. Am. J. Dis. Child., 1923, **26**, 309.

Goldberger, J., and Lillie, R. D.: A Note on an Experimental Pellagra-like Condition in the Albino Rat. Pub. Health Rep., 1926, **41**, 1,025.

Guha, B. C.: The Vitamin B2-Potency of Commercial Liver Extract. Lancet, 1931, **1**, 864.

György, P.: Investigations on the Vitamin B2 Complex; the Differentiation of Lactoflavin and the "Rat Antipellagra" Factor. Biochem. J., 1935, **29**, 741.

Lewis, G. E.: The Smooth Tongue; a Study in Deficiency Disease. Practitioner, 1930, **125**, 749.

Miller, D. K., and Rhoads, C. P.: The Experimental Production of Loss of Hematopoietic Elements of the Gastric Secretion and of the Liver in Swine with Achlorhydria and Anemia. J. Clin. Investigation, 1935, **14**, 153.

Strauss, M. B., and Castle, W. B.: The Nature of the Extrinsic Factor of the Deficiency State in Pernicious Anemia and in Related Macrocytic Anemias; the Activation of Yeast Derivatives with Normal Human Gastric Juice. New England J. Med., 1932, **207**, 55.

Strauss, M. B.: The Rôle of the Gastro-intestinal Tract in Conditioning Deficiency Disease; the Significance of Digestion and Absorption in Pernicious Anemia, Pellagra and "Alcoholic" and other Forms of Polyneuritis. J. A. M. A., 1934, **103**, 1.

Weller, G. L., Jr.: Clinical Aspects of Vitamin B Complex Deficiency in Association with Disease of the Gallbladder. (To be published.)

Weller, G. L., Jr.: Factors in the Differentiation of Pernicious Anemia from Related Deficiency Diseases. Medical Papers Dedicated to Dr. H. A. Christian, February, 1936.

Whipple, G. H.: Hemoglobin Regeneration as Influenced by Diet and Other Factors. Noble Prize Lecture. J. A. M. A., 1935, **104**, 791.

PROCTOSCOPIC FINDINGS IN ULCERATIVE LESIONS OF THE RECTUM AND PELVIC COLON

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It is amazing how often pathological changes may be seen in the rectum and terminal portion of the colon. It would be untrue, however, to state that all colonic affections, at some time or another, can be seen during proctosigmoidoscopic examination. However, at many stages of colonic affections the judicious use of the anoscope, proctoscope and sigmoidoscope reveal pathological changes in the bowel surface. If every examiner would consider his patient to have one of the more common conditions, a correct diagnosis could be ultimately reached more often than by consideration of the rarer lesions of the rectum and pelvic colon.

An attempt at classification of ulcerative lesions of the large bowel into acute or chronic conditions, local or diffuse lesions or into colonic manifestations of constitutional diseases would be productive of much confusion. A more practical method of approach would be to consider these conditions in the order of their frequency. In this presentation one should not be influenced too greatly by such an arrangement. For instance, the physician in our southern states no doubt will see more cases of amebiasis than the physician of the North. For this obvious reason, amebiasis as a cause of ulcerative lesions of the pelvic colon and rectum takes precedence over ulcerative colitis in these localities. It is, therefore, advisable to interpret and modify the frequency of these conditions in the light of their geographic distribution. This can best be done by the individual physician.

Many of these patients have a thorough gastro-intestinal investigation by means of physical examination, roentgenologic investigation and laboratory studies and, a valuable procedure—proctosigmoidoscopic examination—is omitted. Is it not proper and fitting to concede that direct visualization of any lesion is, in the majority of instances, more valuable than indirect examination? Roentgenologic examination is properly considered an indirect method of examination and depends upon the deformity in the barium shadow produced by the lesion. There are many times that loops of bowel containing barium superimpose their shadows upon each other. It is a matter of conjecture how many lesions producing filling defects are thus obscured or unseen. Particularly is this true in the pelvic colon, and cautious roentgenologists are coöperating more and more with proctologists in searching out these lesions. The proper correlation of these two methods of examination should be worked out on a more satisfactory basis than is now prevalent in most communities.

ULCERATIVE COLITIS

The incidence of this condition in the general run of patients seen by the general practitioner is rather small and to my knowledge figures are not available to indicate its prevalence. There is, however, an increase in its incidence among patients seen by the internist and particularly the gastro-enterologist. The gastro-enterologist should be constantly on the alert to discover this condition, since the majority of cases often present pathological evidence of ulcerative colitis in the rectum and pelvic colon in the early stages of their illness. Only a small minority have a segmental type of lesion involving isolated portions of the colon, and not infrequently among these only the right portion of the colon is involved.

Inasmuch as this disease may begin as an acute condition and later become a chronic disease characterized by remissions and relapses, a description of the proctoscopic picture during these phases is of more value than a description of stages of the disease.

In the early phase of a new case of ulcerative colitis the bowel may be seen as an inflamed, hyperemic edematous mucous membrane which bleeds readily to the touch. It presents the appearance of an ordinarily inflamed mucosa without any sharp line of demarcation. There may be a gradual transformation to normal mucosa within the field of vision. That is all that may be seen in the early phase, and the condition must be differentiated from all of the inflammatory lesions of the rectum and pelvic colon. This is rarely possible from the visual appearance alone, and cultures obtained by simply passing a sterile swab across the surface of the bowel should be taken at this time. With progression of the disease the bowel appears slightly thickened, the folds of the mucosa stand out firmer, they appear velvet-like and bleed readily when touched with the instrument or with a swab. The mucosa begins to take on a granular, glistening appearance, and minute mucosal abscesses appear. These diffuse abscesses are seldom larger than 1 mm. in diameter and impart a slightly yellowish tinge to the mucous membrane. They rapidly disintegrate and ulcerate through the surface of the mucous membrane where they may coalesce to form both the discrete and confluent ulcerations characteristic of ulcerative colitis at this time. Cultures taken from the bowel surface reveal a multiplicity of organisms which may be differentiated by subculture and other procedures. When the surface of these ulcers is attacked by, or covered with the numerous organisms present in the gastro-intestinal tract, the segregation of the responsible organism or group of organisms presents a bacteriological problem beyond the limits of this paper.

Any phase of this picture may be seen during the new case of ulcerative colitis.

The recurrent chronic case of ulcerative colitis presents a different proctoscopic picture. Due to ulceration, healing, scarring and contracture many bizarre and unique findings may be observed. The contracture of the bowel may be observed to give a more resistant feel during the manipulation of the instrument. The mucosal folds do not roll back and away from the edge of the instrument as it is being introduced. Bleeding occurs readily on contact with the granular bowel surface. Old healed ulcer areas, if large, present irregular dimpling of the wall. Hyperemia and edema of the areas between healed lesions is of great degree, and the minute ulcers again appear. In contrast to the early ulcerations which tend to be more diffuse and smaller, these ulcerations may attain the size of 1 to 2 cm. due to secondary infection and loss of bowel resistance. The narrowing of the bowel is diffuse and does not tend to produce the short diaphragmatic type of stricture. The long tubular stricture is the rule when stricture does occur. The degree of stenosis is often indicative of the severity and duration of the disease. In cases of long standing the mucosal areas between healed and unhealed ulcers may pile up and give one the impression that they are looking into an inflamed, moth-eaten tube irregularly studded with small polyps. The surface of these polypoid elevations is usually irregular and shaggy-like, and does not present the smooth surface seen in the polyps present in familial polyposis. Finally, any patient who has a diffusely inflamed rectum and pelvic colon should have cultures taken from this area, and ulcerative colitis should be given consideration.

AMEBIASIS

The differentiation of amebic colitis from any infectious colitis often presents considerable difficulty. The colitis associated with the various forms of bacillary dysentery and infectious ulcerative colitis must be given consideration. Amebiasis in its acute, chronic or atypical forms will tax the ingenuity and acumen of many diagnosticians. The ultimate diagnosis of amebiasis rests upon the identification of the causative agent in the excreta in the majority of instances. Cultural and serological means of diagnosis are beyond the limits of this paper, since it is felt that these methods of diagnosis are beyond the facilities of the average practitioner. Proctoscopic examination during the initial onset or the acute phase of this condition may present evidence of amebic ulceration of the bowel. However, in contrast to ulcerative colitis, the rectum and pelvic colon are less frequently the site of the initial lesions. The ulcerative lesions of amebiasis, when present, may occur anywhere in the colon, and their absence in the lower visible segments does not rule out this disease. When present, the ulcerative lesions cannot be considered pathognomonic for this infestation. Their value lies in that scrapings from the ulcer areas, in the majority of instances, reveal the motile vegetative organisms. Culture for ulcerative colitis should be done at this time since these two diseases may occur concomitantly.

When present in the lower bowel, amebic ulcers appear to be fairly deep and to have irregular, sharply defined margins with ragged edges. They first appear about the size of a millet seed. Their necrotic surface is covered with a frankly thick purulent exudate mingled with necrotic material and mucus. This piling up of material may produce an umbilicated effect. With the occurrence of discrete ulcerations the intervening mucosa is mildly injected and edematous, but, at the same time, it appears more normal than in ulcerative colitis, in which the mucosa presents diffuse inflammation and edema. The ulcerations tend to be larger than in ulcerative colitis, and they often coalesce to form a large denuded surface. In cases of any duration the submucosal infiltration produces a thickening of the bowel, so that the normal pliability is lost. Stricture of the tubular type may occur as does ulceration and fissuring about the anus. Bleeding readily appears upon the slightest trauma to the bowel surface The proctoscopic picture may present anything from a single ulcerative lesion, multiple ulcerations or a granulomatous segmental tubular stricture. The essential feature to remember is that when ulcerative lesions are seen during a sigmoidoscopic examination amebiae should be looked for in the scrapings obtained from the bowel surface. Although it is possible to obtain the organism in approximately 75 per cent of cases seen by routine stool examination following the administration of magnesium sulphate, all ulcerative lesions of the anus, rectum and pelvic colon should be examined for amebiasis.

MALIGNANCY

While precedence is given ulcerative colitis and amebiasis for the production of ulcerative lesions of the rectum and pelvic colon, the remaining etiological factors are much more difficult to classify according to their incidence. The importance that malignancy plays in this location warrants its discussion at this time.

The large, fungating, necrotic cauliflower mass of carcinoma of the rectum, which should rarely be overlooked upon digital examination, does not require visual description here. The smaller ulcerating lesion may be encountered in the rectum and pelvic colon and should always be looked for during examination. The incidence of cancer of the colon may be considered to constitute approximately 15 per cent of all cancers, and cancers of the rectum and pelvic colon comprise practically 80 per cent of these colonic malignant lesions. Therefore, the general practitioner, the internist, and the gastro-enterologist can expect to find that a high percentage of their patients who are suffering from colonic dysfunction have a malignant growth. If, during proctoscopic examination, a single discrete ulcerating lesion is seen, it should be considered a malignant ulcer until proved otherwise. These lesions are nearly always a single crater with raised, indurated irregular borders surrounded by a very small area of inflammation. The adjacent and remaining mucous membrane is normal. The lesion is usually fairly small, probably 1 cm. or less in diameter, and fixation is not marked at this early stage. Of course, the large fungating lesions are obvious. The smaller lesions must be differentiated from a single amebic ulcer, a tuberculous lesion, the ulceration of diverticulitis with associated inflammatory stenosis of the bowel lumen and from the rarer forms of ulcers. The choice of procedure would be to culture the lesion, examine the scrapings and secure a biopsy specimen.

TUBERCULOSIS

Tuberculous ulceration of the rectum and sigmoid is, in the vast majority of instances, secondary to tuberculous foci elsewhere. Direct implantation of the organism upon the mucosal surface of the bowel may occur from within the bowel lumen. Infection by way of the blood stream may also be properly considered responsible for a local lesion in many cases. The primary lesion or tubercle is rarely seen, but when caseous degeneration and ulceration appear the lesion may make itself known. The majority of these lesions appear as the single ulcer which tends to be fairly large, 3 to 4 mm. to many cm. in diameter. The lesions progress slowly along their periphery and are essentially indolent. They do not tend to produce as many inflammatory changes as other types of lesions. Stricture is unusual. The ulcers produce considerable induration which is sharply and locally defined, and this type of ulcer must be differentiated from a malignant ulcer. They are irregular, jagged ulcers whose base is covered with purulent necrotic material. The larger lesions may have a dirty grey, tenacious slough on their surface that can be wiped away with difficulty. The adjacent and remaining mucosa is normal. Multiple ulcers of this type may be seen. Culture, smear of the scrapings and biopsy are indicated in making the differential diagnosis of these lesions.

DIVERTICULITIS

The proctoscopic diagnosis of diverticulitis is a most unusual feat attended by so much uncertainty that one is forced to concede it to the realm of chance. When this condition has an associated extramucosal narrowing of the bowel lumen, due to long-standing inflammatory changes, ulceration of the bowel may occur. The ulceration in these cases usually represents the trauma of fecal material and will respond to a dietary program and a régime of irrigations. Diffuse low-grade inflammation may be seen throughout the mucosa in some of these cases. This condition must be given proper consideration in the stenosing deformities of the pelvic colon, since there are times when its confusion with malignancy has occurred.

BACILLARY DYSENTERY

The acute phase of bacillary dysentery has been reported as beginning often in the rectum and pelvic colon. However, in contrast to ulcerative colitis, it is felt that this condition more commonly locates in the iliocecal region and from there may progress in either direction. Its differentiation from the segmental forms of tuberculosis and ulcerative colitis produces a diagnostic problem.

When this process begins in the rectum or pelvic colon a diffuse inflammatory reaction of the mucosa occurs. This is followed by superficial ulceration. The ulcers tend to be a little more numerous and closer together than in amebiasis. By proctoscopic examination it is impossible to distinguish this phase of bacillary dysentery from any of the other diffuse ulcerations of the rectum and sigmoid. Culture for the organisms is usually positive during the early phase of this disease, but later it becomes very difficult to isolate the organism from the excreta. The agglutination tests are of great value in this disease.

VENEREAL DISEASES

The prominence given certain venereal diseases of the rectum in the production of inflammation, ulceration and stricture is being revised in the light of recent investigation. The rôle of syphilis is much over-rated in the production of lesions of the rectum, and syphilitic ulceration is rare enough to be dismissed by saying that there are usually signs of this condition present elsewhere. Gonococcic infection of the rectum rarely presents anything more than the finding of mucopus in the last few inches of the rectum. It is often unattended by any symptoms, but is found in a considerable number of active cases of gonorrhea. Especially is this true in the female. The appearance of chancroidal ulceration which is considered to be caused by the Bacillus of Ducrey and the appearance of rectosigmoidal ulceration and stricture associated with lymphogranuloma inguinale bears some comment. Isolated chancroidal ulceration of the rectum occurs, with few exceptions, only in the presence of chancroidal lesions of the anus. The lesions of lymphogranuloma inguinale usually appear about the anus, genitals or inguinal region, and when producing rectal stricture and ulceration these lesions are visible. Much work is now being done to show that this venereal disease produces more strictures and ulcerations of the rectum than the other conditions mentioned. In the presence of tubular stricture of the rectum with ulceration this condition must be differentiated from ulcerative colitis and amebiasis. The Frei test is the most recent diagnostic weapon in making this differentiation.

The more unusual forms of ulceration are of little interest to anyone except a proctologist. These conditions are, therefore, omitted. In conclusion, it may be emphasized that endoscopic investigation of the terminal portion of the bowel has been very much neglected. Much can be accomplished by the judicious use of direct visual examination of the rectum and pelvic colon. Proper interpretation of findings constitutes a very large factor in this work.

Current Prevalence of Communicable Diseases in the United States February 23–March 21, 1936.

Influenza. During the 4 weeks ended March 21 approximately 44,000 cases of influenza were reported, as compared with 19,456, 11,259, and 11,332 for the corresponding period in the years 1935, 1934, and 1933, respectively. . . .

Meningococcus meningitis. This disease, which for more than a year has been at a relatively high level, continued to increase during the current 4-week period. The number of cases rose from 800 for the preceding 4 weeks, to 1,172 for the 4 weeks ended March 21. The total was 1.8 times that for the corresponding period in 1935 and more than 5 times the number in 1934. The incidence, however, did not reach the level of 1929, when the peak of several years of high incidence was closely approached during this period and 1,257 cases were reported. The high incidence of that year was followed by several years of gradually declining incidence until a low of 225 cases was reported for this period in 1934. . . . In all regions of the country the current incidence has been considerably in excess of that for recent years. During the period included in the table the incidence in the West North Central region dropped below that for the corresponding period in 1935, and in the East North Central region it dropped to last year's level. In all other regions the incidence remained well above that in the 2 preceding years. The South Atlantic and South Central regions were the only ones to exceed the 1929 figures, but in these regions the incidence in 1930 was higher than that in 1929. For the 12 weeks the total for the South Atlantic region was 640, as compared with 104 and 256 for the corresponding periods in 1929 and 1930, respectively. In the South Central regions 719 cases were reported, as compared with 303 in 1929 and 627 in 1930. . . .

Diphtheria. The incidence of diphtheria was the lowest during this period in the 8 years for which data are available and was probably the lowest for all time; 2.139 cases were reported for the 4 weeks ended March 21, 1936, as compared with 2,533 for the corresponding period in 1935. The West North Central region reported a slight increase (about 10 per cent) over the figure for this period last year, but all other regions reported decreases ranging from 10 per cent in the South Atlantic and South Central regions to almost 40 per cent in the East North Central region. . . .

Measles. The number of cases of measles rose from about 29,000 for the preceding 4 weeks to approximately 44,000 for the 4 weeks ended March 21. While the expected seasonal increase was apparent in all sections of the country, the number of cases was only about 35 per cent of the number reported for the corresponding period in each of the 2 preceding years. Measles, however, was unusually high in both of those years and the current incidence was considerably below the average for more "normal" measles years (1929–33, inclusive). In the Mountain and Pacific regions the incidence still remained the highest in recent years, but in other regions it stood at about the normal seasonal expectancy.

Mortality, all causes. The average mortality rate from all causes in large cities for the 4 weeks ended March 21, as reported by the Bureau of the Census, was 14.2 per 1,000 inhabitants (annual basis). The current rate is the highest recorded for this period since 1929, when the rate for the corresponding period was 14.8. The average rate for the years 1930 to 1935, inclusive, was 13.0. During this period in 1929, influenza and meningitis were both high, and the current high rate appears to be attributable to the same diseases, particularly to influenza.

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The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(Continued from March, 1936)

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Traumatic Diseases

In considering the traumatic diseases of the nervous system, one is immediately faced by a number of difficulties, principal among which are those of classification. Within recent years our knowledge of certain clinical pictures and their underlying pathological foundation has been greatly advanced, and one is strongly tempted to make a clinical classification upon a pure pathological basis. It must, however, be remembered that certain terms, such as compression of the brain and fracture of the skull, while of dubious pathological significance, have been in use for many years and, as a general rule, convey a very definite meaning. It is felt, therefore, that such terms may be retained, granting an understanding of their basic pathological connotation. It must also be emphasized that injury of the bony coverings of the nervous system is of little significance when considered apart from damage to the underlying nervous tissue. The term skull fracture is retained only because of the general impression that blows sufficient to cause fracture of the skull must almost necessarily cause a certain amount of damage to the underlying brain tissue.

CEREBRAL CONCUSSION

This term is used to denote those injuries to the brain without fracture of the skull resulting in from mild to moderate clinical symptoms.

Etiology. The etiology is always that of a blow upon the head, usually direct but occasionally indirect, the latter usually the result of sudden explosion and expansion of air.

Physiological and Pathological Considerations. The pathological findings in simple concussion are extremely variable and often minimal. Usually, however, there is a certain degree of cerebral edema and hyperemia and a variable number of small punctuate hemorrhages usually in, or near the cortex. A slight amount of subarachnoid hemorrhage is also common. Following subsidence of the acute disturbance tiny areas of cerebral softening may be found.

Symptoms and Signs. In this condition subjective symptoms far outnumber objective signs. There is usually some slight disturbance of consciousness, rarely any prolonged disturbance. Loss of consciousness when present is usually only momentary, and there may be only a sensation as of being dazed or confused. This type of concussion is extremely common and as a matter of record almost universal. As a general rule the patient recovers without any severe sequelae, but occasionally one sees persisting and annoying complaints. The commonest of these are headache and vertigo, both of which may persist for some time but eventually clear up. At the time of the acute trauma there may be a very slight elevation of temperature and some change in the pulse rate. Lumbar puncture as a rule shows very little in the nature of pathological disturbance. The pressure is not elevated and only an occasional red blood cell is found. As a matter of fact, free blood in the spinal fluid is rather unusual and occurs only when there has been subarachnoid bleeding. X-ray reveals no fracture of the skull, and there is never seen any bleeding from any of the cranial orifices.

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*This is the seventh instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for young graduates. Other instalments will follow until completion.

Course and Prognosis. The immediate outlook in simple concussion is always favorable. The eventual outlook is generally favorable. This latter statement must naturally be qualified since the eventual prognosis depends upon the amount of actual damage to the brain. Should posttraumatic symptoms persist for longer than a few months, one may be safe in assuming that the injury was more severe than that of a simple concussion.

SKULL FRACTURE

At the risk of repetition I wish to emphasize again the true meaning of this term. It is to be used only in the sense that there is understood to be grave damage to the brain tissue itself.

Etiology. Skull fractures are always caused by blows upon the head.

Physiological and Pathological Considerations. The fracture may be a simple linear one of the vault or of the base, may be compound or may be comminuted. It may be depressed and actually press upon the meninges and brain substance. The fracture may occur at the point of application of the blow or at some remote point of the skull. As regards the brain there is early edema and hyperemia which may reach considerable proportions. This naturally, if unchecked, gives rise to increase in the intracranial pressure. The cerebral trauma accompanying fracture of the skull is practically always that of intracranial hemorrhage of variable degree. There may be multiple petechial hemorrhages within the brain substance itself or there may be actual massive hemorrhages. Actual laceration of the brain is common in severe injury. Bleeding into the subarachnoid space is also very common, the result of tearing of pial veins. Hemorrhages outside the dura, the so-called extradural hemorrhages, are usually the result of trauma to the middle meningeal artery or its accompanying venous sinus. The commonest pathological findings following the acute stage are cerebral softening and cyst formation, meningeal thickening and adhesions, very probably the result of the irritating action of the extravasated blood, and chronic subdural hematoma. This latter condition is surprisingly common. It consists of an encapsulated accumulation of blood below the dura which does not coagulate but eventually becomes cystic and absorbs fluid through its semi-permeable membrane. Depending upon its location it may cause only signs of generally increased intracranial pressure or, on the other hand, actual signs of local cerebral irritation.

Symptoms and Signs. Accompanying fracture of the skull there is practically always loss of consciousness of variable duration from several minutes to several days. The duration of the period of coma depends naturally upon the degree of cerebral edema and hemorrhage. At first the pulse rate is usually increased, then later with the onset of marked increase in intracranial pressure it drops, usually becoming subnormal. Respiration is affected, becoming irregular, sometimes Cheyne-Stokes in character. The skin is cold and clammy; the pupils fixed, usually small. All reflexes are abolished and there is incontinence of bladder and bowel. Free blood is practically always found in the spinal fluid, and the pressure, while it may be normal at first, usually becomes elevated. Actual fracture of the skull may sometimes be palpated, especially if there be a wound of the scalp. This is particularly true of depressed fractures. Bleedings from the nose, mouth and especially the ears are strongly suggestive of fracture of the base of the skull. Should the patient survive the immediate effect of the trauma and regain consciousness, a number of signs and symptoms may be expected to appear, depending naturally on the location and extent of cerebral damage. The commonest single sign of severe intracranial injury is that of paralysis of the abducent nerve with resulting internal strabismus. Recovery of consciousness is usually gradual and is often accompanied by transient periods of delirium and apparently psychotic manifestations. Following this there are usually complaints of excruciating headache, vertigo, and very often stiffness of the neck. In this connection it should be remembered that compound fractures of the skull very often give rise to secondary pyogenic meningitis.

Still later on the picture may develop along a number of lines, the commonest of which is that of the so-called posttraumatic or post-concussion syndrome. In this condition again symptoms are much more prominent than signs. Headache and dizziness are once more the commonest complaints along with easy fatigability, lack of concentration, emotional instability, photophobia, tremor and various paresthesias. These symptoms may persist for extremely long periods of time and in view of the frequent lack of objective findings were, until comparatively recently, considered to be purely functional. On closer investigation, however, a certain number of objective findings are uncovered. There may, for instance, be some low-grade edema of the optic discs, a little nystagmus or facial weakness and especially reflex changes or the appearance of abnormal reflexes. The cerebrospinal-fluid pressure is often found to be moderately increased. Most significant, however, of all of these findings is that which depends upon lumbar-air injection. It is extremely common following severe head injuries to find a number of intracranial disturbances revealed by air injection and X-ray. Generalized or focal atrophy of the cortex is probably the commonest of these findings, along with distortion of the ventricles, and very frequently ventricular enlargement. The contractions of cortical scars may also produce characteristic distortions of the ventricles.

Traumatic epilepsy may also follow upon serious injury to the brain. It is not especially common, occurring in perhaps 5 to 10 per cent of all cases. It usually occurs a number of months after the original injury, may show grand or petit mal symptoms, and may be generalized or Jacksonian.

Epidural hemorrhage following head injury usually gives a fairly characteristic picture. Following an initial period of unconsciousness, the patient regains consciousness only to lapse after several hours or even days into a stuporous state that gradually deepens into coma. The pupil on the side of the lesion is usually dilated. Trephine at this stage usually reveals bleeding above the dura in the region of the middle meningeal artery.

Chronic subdural hematoma presents symptoms that appear some time after the original accident, usually weeks or even months. These consist of increase in headache and vertigo, edema of the optic discs, sometimes more marked on the side of the lesion, dilatation of the pupil on the side of the lesion, although this is not constant, and abnormal disturbances such as reflex changes on the side opposite the lesion.

Course and Prognosis. It must be obvious that the prognosis following fracture of the skull depends upon a number of factors, such as the location and extent of the lesion, the age of the patient, and other complicating physical disturbances, such as chronic illness, arteriosclerosis or acute intercurrent infection. Sudden or early death following blows upon the head is extremely common, and residuals, even after recovery, are frequent. In general, if the patient regains consciousness the outlook for life is good. Many patients recover completely, but actual definite prognosis is almost impossible.

COMPRESSION MYELITIS

Etiology. Compression of the spinal cord, when due to trauma, results most commonly from fractures and dislocations of the vertebrae, and from gunshot and stab wounds.

Physiological and Pathological Considerations. The outstanding pathological picture is that of mechanical interruption of nerve fibers, usually complicated, or accompanied, by hemorrhage. The resulting physiological disturbances depend upon the degree of severity of the lesion and its anatomical location. When actual transection of nerve fibers has occurred there is obviously degeneration of the sensory fibers above the level of the lesion and of the motor fibers below the level of the lesion.

Symptoms and Signs. Compression myelitis due to trauma is practically always an acute affair, and even when the pathology concerned is principally that of hemorrhage and edema without actual transection of the cord there is usually an immediate sensory and motor paralysis below the level of the lesion. At this stage, which may be called the stage of shock, there is complete loss of sensation to all stimuli, complete motor paralysis, complete loss of sphincter control and complete loss of all reflexes, both deep and superficial. The motor paralysis at this stage is a flaccid paralysis. Eventually as the stage of shock disappears and edema and hemorrhage subside, the paralyzed extremities gradually regain tone and finally become hypertonic. This is accompanied by the reappearance of the deep reflexes and the appearance of abnormal reflexes such as clonus and the Babinski sign. If the lesion is a complete transverse one this picture persists, along with a typical "cord" or automatic bladder. If the lesion is incomplete, following the state of shock certain evidence of the integrity of the remaining pathways of the cord will appear. Return of sensation below the level of the lesion is an especially important sign. The position of the paralyzed limb is also of some importance in evaluating the degree of damage. In general, in incomplete lesions of the cord, the paralysis is in extension, whereas in complete lesions the paralysis is predominantly flexor. The spinal fluid findings vary a good deal at different times. Immediately after the trauma one commonly finds bloody spinal fluid and either complete or incomplete spinal fluid block, depending upon the degree of hemorrhage and edema of the cord itself. These findings eventually disappear. The level of the lesion is usually not difficult to determine either by neurological or by X-ray examination. The disturbances of sensation are especially reliable.

Course and Prognosis. These depend upon a variety of factors, the most important of which is the presence or absence of infection which is extremely common in gunshot and stab wounds and may give rise to a fulminating and fatal meningitis. Injuries to the upper two cervical segments are usually fatal, while injuries to the third and fourth cervical segments result in disturbances of respiration, due to a lesion of the phrenic nerve, which often causes a fatal pneumonia. Incomplete lesions of the cord below the cervical segments, if unaccompanied by infection, usually recover to a certain extent but always present residuals of some atrophy, spasticity and reflex or sensory changes. Even complete lesions of the cord below the cervical area are compatible with life for long periods if proper nursing care is instituted and precautions taken against the development of decubitus ulcers and ascending urinary infection.

HEMATOMYELIA

Hematomyelia, or hemorrhage into the spinal cord, may, strictly speaking, be said to occur in a number of conditions. I wish, however, to limit its use to that following trauma.

Etiology. Hematomyelia most commonly follows blows upon the head, back and buttocks and is said to be particularly frequent in young individuals.

Physiological and Pathological Considerations. The pathological picture is that of sudden extravasation of blood, usually from rupture of one of the branches of the anterior spinal artery. The hemorrhage is generally fairly well localized and affects the grey matter of the cord much more than the white matter, and the cervical region more often than others. Since the white matter is seldom affected to an appreciable extent, permanent motor and sensory disturbances below the lesion are comparatively unusual.

Symptoms and Signs. The onset is typically apoplectiform, with complete motor and sensory paralysis below the lesion, even though the limits of the hemorrhage do not extend beyond the grey matter. The paralysis is flaccid, is accompanied by incontinence and is quite similar to that seen in acute cord compression. Within a very short time, usually only a few days, the symptoms begin to recede and in most cases after a few weeks the symptoms and signs persist only at the level of the lesion. These are principally bands of anesthesia and analgesia and local muscle atrophy.

Course and Prognosis. The course of the disease in hematomyelia is progressively favorable. Improvement usually continues up to the point of a few permanent residuals.

BIRTH INJURY

Injury during the course of labor may naturally affect the peripheral nervous system as well as the central, but the former type of injury will be considered under the diseases of peripheral nerves.

Etiology. It is becoming more and more apparent that a number of the neurological disturbances noted in children, and previously thought to be due to trauma in the course of parturition, are actually the result of congenital defects. Of the remainder the majority are due to precipitate delivery, pelvic deformities in the mother, and to various obstetrical procedures at the time of delivery.

Physiological and Pathological Considerations. The usual pathological picture is that of hemorrhage of one form or another, either dural, subarachnoid, or intracerebral. Occasionally depressed fractures of the skull occur as a result of faulty forceps delivery. Hemorrhage from the tentorium is fairly common. Any considerable intracranial hemorrhage in a new-born infant will obviously cause severe functional disturbances that may result in immediate death or grave sequelae.

Symptoms and Signs. In hemorrhage from the dural veins and the great dural sinuses the symptoms are few but serious. There are usually difficulty in resuscitation, recurrent cyanosis, and eventually death from respiratory failure, which is probably due to the increasing intracranial pressure resulting from both hemorrhage and cerebral edema. As for subarachnoid hemorrhage, this probably occurs in a certain percentage of normal deliveries and may give rise to absolutely no symptoms. On the other hand, the arachnoid villi may become plugged by blood and an acute hydrocephalus result. In the case of intracerebral hemorrhages that are not sufficient to cause death the result of the lesion is usually not apparent until some time later when a variety of signs may appear. These comprise various types of paralyses, quadriplegias, hemiplegias and diplegias, convulsions, and varying grades of mental deficiency.

Course and Prognosis. Many of the acute birth injuries result in the early death of the infant. On the other hand, subarachnoid hemorrhage occurring in the course of delivery when properly treated frequently leaves no residuals whatever. Intracerebral hemorrhage is always serious, and even when recovery ensues, residual stigmata are the rule.

DIAGNOSIS OF TRAUMATIC DISEASES

Cerebral Concussion. The diagnosis of cerebral concussion is based almost entirely on the history of a blow on the head, confusion, or momentary loss of consciousness, followed by transient headache and dizziness. Objective findings are practically nil.

Skull Fracture. Here, too, the history of trauma to the head is extremely important. There is practically always definite loss of consciousness which may vary from a few minutes to a much longer period of time. Fracture of the vertex may sometimes be palpated, and fracture of the base may be postulated by bleeding from the cranial orifices. X-ray films of the skull frequently reveal the fracture itself. The cerebrospinal fluid is usually bloody and its pressure increased. Posttraumatic symptoms may be severe. Epidural hemorrhage may be diagnosed by the history of injury, loss of consciousness, recovery of consciousness and, later on, within a period of hours or at the most a few days, relapse into stupor and coma. The presence of subdural hematoma is suggested by the history of head injury, by gradual recovery from symptoms and then, after a variable period of time, usually several weeks, increase in symptoms with the appearance of certain objective signs such as edema of the discs and focal signs. The spinal-fluid pressure is usually increased, and the fluid is frequently yellow in color. In all cases suggesting this condition definite diagnosis should be made by trephine opening. Ventriculography or encephalography may also reveal deformity of the ventricle on that side.

Compression Myelitis. Diagnosis of this condition never presents any difficulty, as the history of sudden trauma, with immediate motor and sensory paralysis, signs of a sensory level, and usually X-ray evidence of damage to the vertebrae, are always characteristic.

Hematomyelia. The history of a blow to the skull or spine, with sudden flaccid paralysis, and no evidence of vertebral damage, is strongly suggestive of traumatic hematomyelia.

Birth Injury. This condition is not always easy to diagnose immediately but should be suggested by a history of prolonged or precipitate delivery, visible deformity of the skull, marked cyanosis and respiratory difficulty, and gross blood in the spinal fluid. Later on in childhood it is extremely difficult to distinguish cases of definite birth injury from those of congenital defect.

TREATMENT OF TRAUMATIC DISEASES

Cerebral Concussion. The treatment of simple concussion is purely symptomatic and consists entirely of rest and sedatives. It is, however, a wise precaution, following even a comparatively slight concussion, to insist upon a reasonable period of rest in bed, usually several days.

Skull Fracture. Here the indications for treatment are somewhat more specific, but vary with the type of fracture of the skull, and the type, degree, and extent, as well as the location, of the cranial damage. As regards the fracture itself, if this be depressed, and there be no sign of infection, it should be elevated as soon as the patient's condition permits. It is probably wise, in the case of compound fracture, to treat conservatively until definite indications for operation arise. Simple linear fractures require no treatment. In respect to the treatment of the severe cerebral disturbances that are so apt to accompany fracture of the skull a great deal of disagreement exists. Some advocate merely expectant and symptomatic treatment, others radical operative procedures. It seems quite probable that a middle course between these two extremes is most preferable. This should consist of spinal puncture, both to determine the pressure of the spinal fluid and to decrease it, if increased. Severe edema of the brain, and the secondary increase in intracranial pressure depending upon it, may be well combatted by the proper use of spinal punctures as well as the intravenous injection of glucose or the rectal instillation of magnesium sulphate. Following recovery from the acute symptoms prolonged rest in bed is necessary over a period of weeks or months, and is always indicated. The treatment of epidural hemorrhage and of chronic subdural hematoma is always operative once the diagnosis has been established or even suspected. The posttraumatic syndromes are extremely resistant to treatment. They frequently persist for years in the face of all types of therapy. In a small percentage of cases encephalography by the lumbar route appears to relieve the symptoms. If there is definite evidence of adhesions or of scar formation these should be removed by operation.

Compression Myelitis. Most cases of compression myelitis are best treated conservatively by extension and other orthopedic methods. Even the removal of foreign bodies within the vertebral canal is usually contraindicated until after the period of shock.

Hematomyelia. The treatment of hematomyelia, once the diagnosis has been established, is absolute rest in bed, immobilization, and later on orthopedic apparatus if indicated.

Birth Injury. The treatment of birth injury varies somewhat according to the condition encountered. A depressed fracture need not be elevated immediately, unless it is evident that it is causing cerebral edema and increased intracranial pressure. Subarachnoid hemorrhage due to birth injury is best treated by frequent lumbar punctures. Other types of birth injury are rarely amenable to any sort of treatment.

(*To be continued*)

ABSTRACT OF PAPER READ BEFORE THE SOCIETY

"Clinical Control of the Bladder by the Central Nervous System,"* **Lloyd G. Lewis, M.D.,** Brady Urological Institute, Johns Hopkins Hospital.

The urinary bladder is controlled by reflex arcs in the brain and spinal cord. Motor nuclei are located in the cerebral cortex and in the midbrain. Motor fibers pass down the spinal cord in the lateral columns giving off sympathetic fibers through the thoracolumbar outflow by way of the presacral nerve to the vesical trigon, prostate and seminal vesicles; and parasympathetic fibers by way of the sacral outflow to the vesical detrusor. The sensory nerves of pain from the bladder and vesical neck pass by way of the presacral nerve and communicating rami, ascending in the lateral columns of the spinal cord. Proprioceptive fibers pass by way of the pelvic plexus through the posterior sacral roots, ascending in the lateral columns of the cord. Other pathways probably exist. Lesions may occur on either the sensory or motor side of the reflex arc. Pure sensory lesions are encountered in tabes dorsalis and in certain cases of cerebellar tumor. Predominant motor lesions are seen in pseudobulbar palsy and in disseminated sclerosis. Mixed lesions occur after section of the presacral nerve and in spina bifida occulta. By use of a simple water manometer and recording tambour permanent graphs of bladder activity are made. By allowing water to enter the bladder in equal amounts of 25 or 50 cc. one may study the adaptability of the bladder muscle to sudden stretch and measure its degree of accommodation. The normal bladder quickly accommodates increments of 50 cc. to its capacity of about 500 cc. When the intravesical pressure reaches 12 to 20 cm. of water, the detrusor reacts sharply to precipitate micturition. The tabetic with injury to the posterior sacral roots may accommodate 1,000 cc. at a low-pressure level, and the voiding reflex is not accomplished. In lesions of the motor fibers in the brain or spinal cord, accommodation is hindered and the bladder exhibits in many instances an increased stretch reflex with early emptying. When lesions occur in the spinal cord rapid fluctuations of pressure may occur and contraction waves are of insufficient amplitude to initiate micturition. As a rule, motor lesions produce an irritable bladder of lessened volume. The predominant bladder symptom under sensory-nerve lesions is retention commonly with overflow incontinence. Motor lesions may produce incontinence with an empty bladder. Lesions of the motor fibers in the lower cord may produce urgency and frequency of micturition. By means of cystometry one may judge the degree of motor or sensory-nerve damage, and therapy should be directed toward relief of symptoms. Since the detrusor with its parasympathetic innervation performs the initial act of micturition control of the parasympathetic nerves is indicated. In tabetic types a parasympathetic nerve stimulant in the form of acetylcholine is efficacious. In motor lesions a parasympathetic paralyzing drug of the type of atropine is beneficial. This experimental study has led to findings of vital clinical interest. Clinically it is difficult to find cases illustrating lesions of individual nerve-bundle or fiber tracts, but by comparison and study of a large number of cases we may be able to interpret the physiology of individual fiber tracts.

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*Presented at the joint meeting of the Mid-Atlantic Branch of the American Urological Association and the Society, January 22, 1936.

The Etiology, Diagnosis and Treatment of Hydronephrosis. Hydronephrosis or uronephrosis is a condition characterized by distention of, and retention of urine in the kidney pelvis and its calices. According to various writers on this subject, the normal capacity of the renal pelvis varies from 3 to 15 cc. and any increase in this amount constitutes a degree of hydronephrosis which may be classified according to size as small, moderate and large. . . .

Hydronephrosis may be present in one or both kidneys, may be congenital or acquired, permanent or intermittent, and partial or total in character. In the partial type there is obstruction of one or more calices. Total hydronephrosis is brought about by any one of the many causes which produce obstruction at the uretero-pelvic outlet or of the urinary tract below. . . .

Résumé of Treatment—90 Cases of Hydronephrosis with Ptosis: Nephropexy with relief, 36; nephropexy—failed, 1; nephropexy—bilateral, 9; nephrolithotomy and nephropexy, 4; pyelolithotomy and nephropexy, 3; ureterolithotomy and nephropexy, 1; palliation with relief, 14; palliation without relief, 25; palliation without relief, then nephropexy with relief, 6; nephrectomy, 15.

In 36 cases of unilateral and in 9 cases of bilateral hydronephrosis due to nephroptosis, with angulation of the ureter, nephropexy performed after the method described by Kelly and Broedel has given most excellent results. The kidney and its new intended bed is freed of all perinephric fat; the ureter is also freed of all periureteric fat and bands. Great care is then taken to place the supporting sutures so that the kidney may be suspended in as normal a position as possible.

Extract from article by Joseph C. Birdsall, M.D., *Philadelphia, Pennsylvania Medical Journal, April, 1936, p. 497.*

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PUBLICITY AND THE DOCTOR

"MURDER WILL OUT"

Few subjects of discussion give rise to a wider range of views among physicians than does that concerning public medical information. One doctor feels that nothing should be given to the public, while another swings to the opposite extreme. The question as to whether a doctor's name should be mentioned to the public agitates many. And in the background, weaving in and out of all the problems, appears the horrifying specter of advertising, bearing some resemblance to its twin horror and progenitor—professional jealousy. The truly scientific attitude cares not for personal advertising; the same may be said for the good doctor who is devoted to the needs of those who entrust their physical and often mental welfare to his hands.

First of all, are any rights or duties concerned in this general problem of publicity? The doctor will say that he has a right to be protected from undue exploitation of his own or his neighbor's activities—especially the latter. He will also say that he has a right to be protected from misquotation. He feels that some others have extraordinary access to the means of publicity. He may say that he just wishes to be let entirely alone. The public will say that every step that pushes back the bounds of ignorance is public property. That no one can lock up his discovery in his own mind and not share it with the world. And some maintain that there is a dividing line between modern science and witch doctoring and that the difference lies in the presence or absence of mystery. This last contention has much merit. Wise and frank dealing with the public would do much to satisfy it. The press maintains that it has the right to proclaim to the public the advances of science. And individual newspapers stress the necessity of their doing so before some other paper gets to it.

All of these contentions should be considered in the light of the inescapable fact that whether or not the profession does anything about it, *there will be publicity.* Most every metropolitan daily has one or more men assigned to the job of running down or writing up material with popular scientific appeal. Many magazines do the same. The great news-gathering services and press associations with branches in every well-known city in the world have frequently several men of considerable news-writing talent assigned regularly and specifically to searching out and writing scientific feature stories, which are released to all the newspapers which subscribe to their services. Some such services deal exclusively with scientific stories. For practical purposes all of these publications and news services may be classed together, their primary interest being to disseminate the *newsy* thing, their interest in the scientific aspects being secondary. A glance at any day's paper is sufficient to show the large number of such stories published and the wide distribution they get throughout the telegraph-linked portions of the world.

In searching for the public mental background which has led to this situation we will recall that the medical profession itself in the past century has contributed greatly to the growth of a "health consciousness" in its daily contacts with its clientele. One of the most important factors is the extraordinary impetus given to health consciousness by the phenomenal expansion of public health movements since the early days of the late lamented Theobald Smith about 60 years ago. The press, the public school and the church have played no small part in this growth. It would be difficult to evaluate the relative rôle played by each of the agencies mentioned.

With such a psychic background a large portion of the public demands—and gets—pseudoscientific stories from a variety of sources. Advertisers of all sorts of products have, of course, played upon health consciousness by such well-known slogans as, "be kind to your throat," "not a cough in a carload," "body odor," "halitosis," "four out of five have it," and "athlete's foot." The claims made by such advertisers quite often bear little relationship to candid truth, but the health appeal sells the goods. The amount of this popular demand for "health" titles should not be underestimated. Its volume alone will insure that the press will continue to respond to it. This emphasizes again, therefore, the statement previously made, *there will be publicity*.

One might ask how it might be possible for medical articles to be printed without the help of medical men. The answer, of course, is simple to anyone familiar with the ways of news-gatherers and press-writers. In the first place, the scientific writers mentioned above have a keen nose for scenting out the sources of news. They attend all the important scientific meetings of a national and regional character and make direct reports from their own impressions. In the second place, they find productive ground in scientific publications; and they spend long hours poring over recent or older files of current medical publications. Knowledge of this should make clear to anyone that anything which has ever been reduced to print is public property. Such awareness has the effect among seasoned scientists of causing them to be wary of publishing even to the profession premature or undigested material. Thus it is quite evident that even were it desirable, the medical profession could not stop the flow of popular medical articles in the press. It is equally certain, however, that the stream can be controlled and turned into helpful rather than harmful channels.

This control will be effective or ineffective in relation to whether its rôle be active or passive in the propagandizing of medical science. The confidence of the newspapers and press associations and the individuals employed by them must be gained and kept. They must know to whom to turn for accurate ready information at any hour of the day or night, since news work is as much an emergency to those whose business it is, as a medical emergency is to the doctor. The release of information should be timely and prepared in conformity with customary newspaper copy-writing.

The only proper medium for handling such publicity is, of course, the organized medical body which can by reason of its prestige and standing command at once the interest and respect of its members and the public. It would be to the general interest of the medical profession and the public if overlapping medical organizations could pool their interests in these respects in local communities in order to avoid "buck-passing" when petty jealousies arise. The biggest part of the work of the publicity agency lies not outside, but within the profession. There seems to be serious need for educating the profession along several lines.

The first of these is the recognition of the value of publicity properly controlled. While there has been a notable modernization of attitude in many quarters, numerous members are still living in the "horse and buggy days."

The second is, that so far as names are concerned publicity just naturally gravitates toward those who get things done, as water runs down hill. The press considers news without names as being no news. Understanding of these things will breed a little more tolerance in those who think that certain individuals get too many "breaks" in the news. Every boost which the medical standing of the community receives through thus publicizing its doctors' efforts, will react ultimately in the favor of every medical member of the community so boosted. "United we stand, divided we fall" was never more true at any time than it is today of the medical profession, and the common good derived from controlled publicity is one of the factors by which its truth will be proved.

The third place where the publicity agency must educate the profession is in getting it to recognize that publicity envisages something worth while to publicize. Poorly seasoned material, half-baked theories, or unsavory reports are a poor diet to offer to an epicurean but hungry public and react unfavorably upon the chef.

Fourth, such a set-up having been established, it will be quite easy for all members to avoid the unwisdom of talking to reporters by referring all of them to the publicity agency. In fact, members should be expected to do so. Educational work remains to be done along this line.

The Medical Society is beginning to realize the importance of an adequate information set-up. It is to be hoped that this realization will be followed by a desire which will be strong enough to back financially the necessary cost.

Three things should be recognized:

1. There will always be "medical" publicity.
2. The medical profession should control this publicity in the interest of the public and itself.
3. The control can be effected through an adequate information set-up, if and when the profession becomes willing to support it.

H. P. R.

REPORT OF THE FIRST YEAR'S ACTIVITIES OF THE MEDICAL ECONOMIC SECURITY ADMINISTRATION FOR THE DISTRICT OF COLUMBIA

Medical-Dental Service Bureau

The Medical-Dental Service Bureau completed its first fiscal, as well as calendar year, on March 1, 1936. In spite of the fact that practically no endeavor was made to stimulate the business of the Medical-Dental Service Bureau during the first 4 or 5 months of its operation, the fiscal report for the first year actually is only a half-year report of about 5 or 6 months instead of the full year. The results achieved during that first year outdid even the anticipations of its Executive Director who conservatively estimated the total amount of business to be transacted during the first year at $120,000.00. The business actually transacted exceeded $175,000.00. The last financial report of the Medical-Dental Service Bureau shows it to be highly solvent, the net realizable profit being $5,635.06 over and above all encumberances and indebtedness.

The total amount of business according to the last report in March, 1936, is $182,625.83. Of this amount of business $88,565.32 was actually disbursed to physicians, dentists and hospitals, constituting 90 per cent of the total amount of the collections. This is one of the most unique reports ever to be made by any concern doing an instalment business in a commercial manner, not to mention the handling of these types of accounts. As you can readily glean from these figures, of the total amount of business placed upon the books over 45 per cent of the total value has been paid out to date in spite of the fact that these payments average 8 months in payment duration. Of the total amount of business $46,059.19 is of Medical Society origin.

The statistical report for March the first showed an increase of 32.8 per cent over the preceding month, with an increase of 50.11 per cent in collections over the average of the preceding months, indicating increased efficiency of collections along with an increase in business. The March report shows collections from patients for the month of February totaling $10,378.00. A special report at the end of business on March 12 showed 3 days between March 1 and March 12 having daily collections of over $1,000.00 per day.

A random statistical analysis of the first 1,000 cases put on the books of the Medical-Dental Service Bureau is as follows:

718	Persons out of the 1,000 were accepted by the Medical-Dental Service Bureau for deferred payments.
35	Persons were referred to the Central Admitting Bureau for Hospitals for assistance, these persons not being capable of caring for themselves on the deferred payment plan through the Medical-Dental Service Bureau.
135	Persons were rejected.
195	Cases involved hospitalization only on the deferred payment plan.
109	Cases involved physicians only.
76	Cases involved dentists only.
244	Cases involved hospitals and physicians.
94	Cases involved more than one physician.
9.6	Months was the average duration of payment.
$9.90	was the average amount of monthly payments.
$95.00	was the average size of obligation.

53 People listed small bank loans totaling $11,011.00.
234 People listed instalment accounts to a total value of $38,871.00.

These last two items should be repeated mentally by members of the Society. These two items alone indicate the economic chaos into which our present economic system has thrust people of low income. The one-time hailed boon of instalments on furniture, radios, automobiles and whatnot, indicates the deplorable condition resulting from over-popularizing this poverty-making system to low income people. Incidentally it also demonstrates why the cost of medical care and hospitalization is but a limb on the trunk of an economic problem which must be solved before the cost of medical and hospital care can be solved as a single problem.

These various items are picked at random from the many statistics available in the offices of the Executive Director of the Health Security Administration of the District of Columbia and to which the profession may have access. The Medical Society of the District of Columbia, and particularly the Committee on Medical Economics and its Subcommittee on the Coordination of Resources for Medical Care, can well compliment itself on being responsible for meeting the challenge of socialization of medicine in a concrete, unselfish and sincere manner. The success of the so-called Washington Plan has spread throughout the Nation. The city of Saint Louis, Missouri, is now operating Group Hospital Service (patterned after the Washington, D. C., Group Hospitalization plan) jointly with a Medical-Dental Service Bureau. The city of Baltimore opens its Medical-Dental Service Bureau on April 1, and it is planned to inaugurate Group Hospital Service under joint operation with the Medical-Dental Service Bureau shortly thereafter.

The Board of Directors and the Executive Director of the Medical-Dental Service Bureau, the Central Admitting Bureau for Hospitals and the Health Security Administration of the District of Columbia as a whole have further plans for the forthcoming year. It is hoped that when the details are brought before the Committee on Medical Economics of the Medical Society of the District of Columbia favorable consideration will be given.

Results of the first year's experiment are of such a sound valuable nature that there can be no doubt of this being the logical answer to the adequate care of the sick. With the minimum amount of education that has been promulgated in the past and the maximum results that have been acquired therefrom, it is believed that the maximum amount of education will bring startling results.

Following an address made by the Executive Director before the annual convention of the American Dental Association in New Orleans, the house of delegates of the American Dental Association approved the "Washington Plan." At that same convention the slogan which was devised by the Executive Director was adopted and a copy transmitted to the President of the United States. This slogan as developed by the Executive Director is as follows:

> *"American citizens in accordance with American customs and American traditions desire to pay for what they get. They desire also to get what they pay for. The Health Security Administration of the District of Columbia makes it possible for American citizens to pay for what they get and get what they pay for in accordance with their individual ability or inability so to do. This is an American system for American citizens by American professions."*

CENTRAL ADMITTING BUREAU FOR HOSPITALS

If one were to make an adequate report from the past year's activities of the units of the Health Security Administration of the District of Columbia, a 4- or 5-hour narrative would be necessary. For the sake of brevity, this report will be condensed into the fewest possible number of words and will be limited to a brief summary of statistical items believed to be of interest to the members of this Society.

The history of the Central Admitting Bureau for Hospitals should be well known to all members of the Society. The rapidity with which this plan was put into operation and the astounding results which were achieved almost immediately have caused nation-wide interest and brought acclaim and renown to our Society.

The Central Admitting Bureau for Hospitals handled 7,944 applicants for charity assistance in securing ward accommodations in our 9 private hospitals. After passing through the machinery of the Central Admitting Bureau for Hospitals, 4,744 or 59.7 per cent of the total number of applicants were accepted as being deserving of charity assistance. Of these 7,944 applicants 1,288, or 16.2 per cent, were found to be able to pay the concessioned rate of $4.00 per day without assistance from charity sources. There were 917, or 11.6 per cent, who were found to be so definitely indigent that they were referred to the Board of Public Welfare for admission to Gallinger Municipal Hospital. There were 995, or 12.5 per cent, found to be not only able to defray the expense of their hospital bill but to pay for a physician or surgeon's services as well and were referred back to private care and eliminated from the list of applicants worthy of charity assistance.

So efficient has the machinery of the Central Admitting Bureau for Hospitals become that a transcript from one week's report from the Investigating Department reveals that only 1.7 per cent of the persons investigated gave false information. In verifying 73 items of information on 642 separate cases, 1,428 telephone calls were made.

Interesting information developed from a careful statistical analysis is as follows: Over 42 per cent of all patients requiring assistance for in-patient hospitalization were under 20 years of age. The larger single group was from 20 to 29 years of age (largely because most pregnancies occur between these ages). There were surprisingly few old or even middle-aged persons, and there were almost 2 female patients for every male patient. More than one half of the in-patients were native whites; there being an average of 44 per cent who were negroes and only 3.7 per cent who were foreign. Of the causes necessitating hospitalization, tonsillectomies and pregnancies constituted the two major items; there being an average of 25 per cent for tonsillectomies and an average of 19.4 per cent for pregnancies.

An analysis of the occupations involved of people requiring assistance for hospitalization shows that the largest group was not regularly employed. This group comprised 31 per cent of all applicants. The average earnings of this group was $18.42 per month. Next in size was the private labor group, which comprised 22.9 per cent of the total. The average earnings of this group was $77.67 per month. Government workers represented 12.1 per cent, with average earnings of $107.33 per month. The social status of chief wage-earners showed 72.7 per cent married. The average number of persons in the family applying for aid was 3½ persons per family. It is interesting to note that 42.2 per cent were just rooming. Only 5.2 per cent were buying homes, while only 1.2 per cent owned their homes. The majority, 49.7 per cent, fell in the normal or renter class. Although 56 per cent were known to one or more social service agencies, 21 per cent had automobiles. A high percentage, 64.6 per cent, had insurance, but this was mainly constituted of small industrial policies ranging from $50.00 to $250.00.

An analysis of the reason for assistance being needed for in-patient hospitalization showed 87.5 per cent due to insufficient income for the size of the family. Only 4.6 per cent of those applying for aid gave a history of savings accounts. Previous doctor bills were listed in the liabilities of 7.2 per cent of the applicants. Domestic servants constituted 15.9 per cent of the applicants with an average earning of $48.45 per month. The average income of all applicants for charity assistance and hospital ward service was $65.61 per month, indicating that the in-patients as a class are far below the income level to maintain decent living standards.

Admission to the 9 private hospitals out-patient department by means of a dispensary pass issued through the machinery of the Central Admitting Bureau for Hospitals was commenced in July, 1935. An analysis of the statistics gleaned from one half year's operation of this system reveals the following information: Only 26 per cent of those applying for dispensary passes were native whites, 1 per cent were foreign and 63 per cent colored; 48.5 per cent were males and 51.5 per cent were females. Two thirds of the applicants for clinic aid lived in the northwest section of Washington; the northeast was second with 13.5 per cent. Only 4.5 per cent came from nearby Maryland and Virginia, and only 3 persons out of a check-up on 2,542 applicants were from outside the metropolitan area. Eighty-six per cent of those applying for clinic care were accepted and issued passes at Community Chest expense. Indicative of 1 month's operation is the fact that the Community Chest paid for 21,469 clinic visits during the month of October, 1935, alone. The average income of all families applying for clinic treatment was $53.40, with an average of 2.9 persons per family. Fifty per cent had incomes of less than $50.00 per month, with an average of $24.02. The average white family was 3 persons, and the total income $62.98 per month. The average colored family was 2.8 persons with a total income of $47.89. The largest percentage, 35.9, were not regularly employed, with average earnings of $19.31 per month. Government employees were but 7.8 per cent of the total, with the highest group earnings of an average of $101.74. It must be borne in mind that these figures are on applicants. By far the majority (62.5 per cent) of those applying for clinic aid were married, 11.9 per cent were separated as against 1.2 per cent divorced. Ten per cent were widowed, while 14.4 per cent were single. This latter item of 14.4 per cent of the applicants for clinic aid being single is significant. The material assets of these people are slight. Only one half of 1 per cent have savings accounts of any kind. Only 6.9 per cent had cars, while only 2.1 per cent had ever had any real estate. Forty-six per cent of the applicants for clinic acid were renters, while 44 per cent just roomed. This latter item is significant.

There is a definite relationship between income and health which is too often overlooked in considering both the social and medical problems of any community. Our clinic lines will never grow any shorter until there is a definite improvement in the material welfare of these people. While this is not entirely the concern of the Central Admitting Bureau for Hospitals, it is worthy of this Society's best thoughts and efforts. You cannot keep a man well if you send him home from the hospital or the clinic to unsanitary living quarters and an inadequate food supply. There were 408 persons out of a total of 800 specially analyzed cases in a 2-day interval who were on relief. The clinic line is here to stay until such time as those who compose it are provided with employment and living wages.

An analysis of the passes issued by the Central Admitting Bureau for Hospitals shows that 4.6 per cent were issued for 30 days or less, 39.2 per cent were issued for 30 to 45 days, 33.8 per cent were issued for 60 days, 14.2 per cent were issued for 90 days and 8.2 per cent for over 90 days.

A very brief summary of some of the incidental things accomplished by the Central Admitting Bureau for Hospitals is as follows:

1. It re-allocated an average of 31 per cent of the applicants applying to the Bureau, so that better service was obtained at a minimum cost; causing a drop in total population at Gallinger Municipal Hospital and being instrumental in causing an average increase of 10 per cent in the occupancy of the 9 private hospitals over the occupancy of 1934.

2. It spread the limited amount of Community Chest money available for charity cases over a greater number of cases than the same amount of money cared for in 1934, among which were 19,030½ hospital days for indigent patients not permitted to be paid for under the Community Chest system of 1934. Community Chest money to the amount of $75,108.00 was spent in providing for the 19,030½ hospital days for indigent patients, which sum of money was not spent for such cases in 1934. In spite of this fact the total appropriation of $37,000.00 less than the appropriation of 1934 lasted over the same period of time in 1935 as it did in 1934.

The analysis from these figures indicates that a total of $75,108.00 was actually saved through the machinery of the Central Admitting Bureau for hospitals but in turn was immediately utilized in paying for hospitalization of indigent patients in 9 Community Chest private hospitals instead of placing these patients to be cared for at over-crowded Gallinger Municipal Hospital. Wherever possible the Executive Director of the Central Admitting Bureau for Hospitals personally endeavored to see that the wishes of the individual physician or surgeon serving on the staff in any of the 9 private hospitals who desired to personally take care of some particular indigent case in that hospital, was accorded that privilege and that the indigent patient's hospital bill was paid by Community Chest funds.

3. It set up a statistical and research division providing the public and the hospitals with complete data on all phases of this work.

4. It accomplished all the above without incurring animosity or ill-will and served as an educational medium to create good feeling and understanding of hospitals in the Community Chest's connections with them. It created a standardized method of "metering" the hospital needs and burdens of the entire District—their ability and inability to care for all people in accordance with each person's ability or inability to care for himself, which has created national interest and recognition.

Following the establishment of the Central Admitting Bureau for Hospitals, the Permit Bureau of the Board of Public Welfare has moved from the District Building to the Health Security Building and been housed with the Central Admitting Bureau for Hospitals under the coördinating direction of the Executive Director of the Central Admitting Bureau for Hospitals. Housing of the Permit Bureau of the Board of Public Welfare in the Health Security Building has made it possible for all people of the indigent and semi-indigent class who are unable to defray any portion of the cost of their hospitalization to be "hooked-up" with the public or charity facilities most appropriate for them and their financial limitations. It is not an uncommon thing for many of the applicants to the Permit Bureau of the Board of Public Welfare to be transferred to the Central Admitting Bureau for Hospitals, where they are determined as being capable of defraying a portion of the cost of their hospitalization, thus releasing a portion of the money which would have been utilized for them under the originally applying circumstances to be used for those cases not having even as much financial wherewithal as they themselves.

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The regular meeting of the Washington Society of Pathologists was called to order at 8:08 P.M., March 10, 1936, in the Army Medical Museum by the President, Dr. Wallace M. Yater. There were 28 members and guests present. The minutes of the meeting of February 1, 1936, were read by the Secretary, Captain Elbert DeCoursey, and approved.

Scientific Paper

"Discussion Relative to the Clinical, Roentgenological and Pathological Manifestations of Silicosis," **Roy R. Jones, M.D.**, Division of Labor Standards, United States Department of Labor.

Silicosis is one of the few conditions which can, strictly speaking, be considered always of occupational origin. Although exposure to other specific dusts is known to produce varying degrees of pulmonary fibrosis, this discussion is limited to that condition resulting from working in an atmosphere where the air breathed contains harmful concentrations of particles of free silica.

Although not properly a part of the subject assigned for discussion, it seems best to make a brief statement regarding the etiology of silicosis. The primary etiological factor is free silica (SiO_2). The degree of pulmonary fibrosis resulting from the breathing of free silica is dependent upon the concentrations of free silica in the air breathed, the size of the particles and the duration of exposure.

It is only the extremely fine silica particles which are harmful (those less than 10 microns in their greatest diameter). The larger particles in the air are retained on the mucous membranes lining the upper respiratory tract, and are eliminated with the sputum. A small portion of those under 10 microns are retained in the terminal air spaces and only eliminated by way of the lymphatics. It requires from 3 to 30 years to develop a disabling silicosis.

The chief predisposing factor and secondary cause of silicosis may be considered pulmonary infection. Infection complicates the picture in practically all cases of advanced silicosis or those exhibiting any decreased capacity for work. It has been estimated that 75 per cent of those dying of silicosis have pulmonary tuberculosis as a complication.

CLINICAL MANIFESTATIONS

There are no clinical signs or symptoms pathognomonic of silicosis, but with the knowledge gained through the obtaining of a complete past occupational and past medical history, and certain signs and symptoms usually commonly exhibited by the silicotic, it is possible to arrive at a definite diagnosis. One point to be emphasized at this time is the necessity for correcting the erroneous idea which has gained rather universal acceptance, namely, that it is possible to diagnose silicosis by an X-ray film. While it is not possible to make a definite diagnosis without an X-ray picture, it is not possible to depend upon the film alone. There are 2 chief forms of silicosis—simple silicosis and silicosis with infection. In turn, each of these forms may be subdivided into 2 classes, disabling and nondisabling.

The general appearance of individuals with silicosis may or may not suggest the condition. Early, these workers appear strong and robust, and unless they are closely observed, nothing about their general appearance suggests the presence of pulmonary fibrosis. If watched closely, the least exertion demonstrates a change in respiratory rhythm, with a shortness of the inspiratory phase and a prolongation of the phase of expiration. Early, some may gain weight and appear soft, due to slowing up of their activities because of shortness of breath. As the condition advances and infection enters the picture, the general appearance gradually changes. The respiratory embarrassment is quite evident, and later there is a wasting of subcutaneous tissues, a gradual loss of weight, and the common landmarks of the bony thorax become prominent. There is a retraction of the supra- and infraclavicular spaces. The chest has a tendency to become barrel-shaped, of the emphysematous type, and expansion is restricted. In general, the individual appears chronically ill.

The earliest and most common sign exhibited is shortness of breath. In the beginning, this is only noticed following strenuous exercise or a severe coughing attack, but as the disease progresses, the dyspnea becomes exceedingly troublesome. One peculiarity of the dyspnea associated with silicosis, even though marked, is that unless the condition has progressed to where there is a circulatory embarrassment, it is rarely associated with orthopnea.

A troublesome cough is commonly associated with this shortness of breath. Early, this cough is not complained of, but gradually becomes so persistent that it may be the individual's chief complaint. It is first dry, rasping and unproductive, but as chronic pulmonary infection complicates the silicotic condition the cough becomes productive, depending much upon the degree and type of infection and the amount of emphysema and bronchial dilatation which develops. When the emphysema is marked or coughing attacks are severe, or when degenerative processes have set up in the area of fibrosis, the sputum may become blood-streaked or purohemorrhagic. In cases where the predominating infection is due to the mixed organisms commonly associated with infection of the upper respiratory tract, this coughing may result in the raising of copious amounts of putrid material characteristic of that type of infection.

Hemoptysis occasionally occurs. It is always suggestive of a complicating tuberculous process, but has been noted in cases of simple silicosis, particularly associated with strenuous effort or severe coughing attacks.

Pain in the chest varies, but is rather common, particularly in the well-advanced cases or when the condition develops in a person who has previously experienced serious attacks of pneumonia and pleurisy. It may be only a sensation of soreness and tightness over the chest generally, but more typically it is pleuritic in character, and more pronounced upon exertion.

Night sweats are frequently complained of in the terminal stages of disabling silicosis, and are significant as regards the character and extent of the pulmonary involvement, suggesting a bad prognosis.

Clubbing of the fingers is frequently observed in the more chronic cases, particularly those with long-standing pulmonary infection and circulatory complications.

Gastric distress and loss of weight and strength are commonly complained of later in the disease, or in cases with considerable complicating infection. These complaints are similar to the same reported by individuals suffering from chronic pulmonary tuberculosis with general constitutional symptoms. These general symptoms are not associated with simple silicosis and are, therefore, always indicative of complications.

Aside from the changes in general appearance mentioned, there are several definite findings usually revealed by careful physical examination of the chest. Decreased chest expansion is not always sufficiently marked to be noted, but as a group, a definite defect of this nature is demonstrable.

Upon percussion there is a general impairment of resonance throughout in well-established cases of silicosis, and it is increasingly more marked in the advanced cases. Since this impairment is general over the entire chest, it requires particular attention to detect it, and the change is often overlooked if silicosis is not suspected.

By auscultation, one finds changes in the breath sounds throughout; they are in general decreased. The typical change in respiratory rhythm is most evident—

a shortening of the inspiratory phase and a definite prolongation of the expiratory phase. This asthmatic type of respiration is due, in part, to the loss of normal elasticity of the lung when fibrotic tissue replaces normal lung structure. Râles of various types and intensity are noted. Lungs with well-developed silicosis but with no infection, may be comparatively free of adventitious sounds and only scattered râles elicited following exercise or deep inspiration. These râles clear up on coughing. In the advanced cases with complications, infectious and circulatory, when the cough has become productive, adventitious sounds characteristic of congestion, chronic bronchitis, bronchial dilatation and emphysema are common generally, and their true significance can be properly interpreted only when considered with the history and other clinical findings.

X-RAY EXAMINATION

Evidence of pathological changes within the chest may always be revealed by X-ray examination, and an absolute diagnosis of silicosis cannot be made in the absence of those characteristic changes indicated by the X-ray. Serial roentgenograms, if taken under conditions which are uniform and using the same technic, are of great value in determining the progress of the condition in a given case.

Fluoroscopic examination is of value in determining the decreased excursion of the diaphragm. This may vary from a slight decreased motion, early in the course of the disease, frequently to complete fixation, particularly in those with serious complicating infections. Frequently adhesions between the pleura covering the lung and that covering the diaphragm, pericardium, and the chest wall may be demonstrated by fluoroscopic examination. Information as to increased pulmonary density as gained by fluoroscopy is of distinct value in determining the penetrating power necessary to secure a good film of the chest.

The characteristic film of simple silicosis shows, symmetrically distributed over all lung fields, discrete nodular shadows superimposed on a background indicating normal lung structure. These nodular shadows may be extremely small, 2 to 3 mm. in diameter or larger, even 6 to 7 mm. The nodules in the individual case are quite uniform in size throughout. Films characterized by the smaller nodules generally show also an increase in the size of the hilar shadow and an increase in the coarse linear markings. As the case develops and the nodular shadows become larger, the hilar shadow recedes and the coarse linear markings tend to disappear.

When silicosis is complicated by infection, those nodular shadows are less distinct and the intervening areas are more dense, and often the pathological changes indicated by the X-ray film are less symmetrical. The growth of the nodular masses within the lung results in consolidated masses, varying in size from 2 to 3 cm. to massive shadows obliterating practically the entire lobe. Usually associated with these massive shadows is a more or less irregular diaphragmatic outline, indicating adhesions.

Areas of increased transparency of the X-ray film, indicating emphysema, become increasingly more frequent and marked as the nodular densities increase in size, due to a dilatation of functioning air spaces in their effort to compensate for alveolar space destroyed by fibrosis. This evidence of emphysema is usually more marked in the bases. Occasionally large blebs may be demonstrated, as well as localized areas of pneumothorax.

Regardless of the specific character of the changes indicated by X-ray, reading of the film should not be in terms of diagnosis, but rather in terms describing the shadows seen. Then, these descriptive shadow terms should be used, as any other laboratory report, in the light of the exposure, the medical history, and the results of the physical examinations.

(Representative case reports, with lantern slide demonstrations of X-ray and pathological findings, followed the general discussion.)

LABORATORY FINDINGS

Laboratory examination of the urine and sputum is of distinct value, when correlated with the clinical manifestations of silicosis.

The material expectorated by the silicotic depends upon the severity of the condition and the complicating infection. In the early stages, the cough, as mentioned, usually is dry and nonproductive, and what sputum is raised is of a clear mucoid character. Those with infection resulting from bacteria associated with poor oral hygiene or upper respiratory infection often raise thick mucopurulent material. When the condition has advanced, the sputum becomes more copious in amount, and foul-smelling. Microscopic examination of this sputum then reveals many spirochetes and fusiform organisms.

The pulmonary tuberculosis complicating silicosis is usually not of the open exudative form, and as in the case of the chronic fibroid phthisis, repeated microscopic examination of the sputum may fail to reveal the tubercle bacilli. Guinea-pig inoculation offers the most certain chance of demonstrating the presence of this organism before the victim has progressed to a terminal stage.

Chemical examination of the urine of the silicotic reveals excessive silica excretion. It is of no distinct value in estimating the degree or extent of the condition, however, and it merely indicates excessive silica intake. Individuals with silicosis, even 7 to 10 years after their exposure has ceased, have been shown to excrete from 2 to 4 times the normal amount of silica. This excessive silica excretion has not been shown to produce any harmful kidney disturbance. Albumin and casts are frequently found in the urine excreted by individuals markedly disabled and in the terminal stages of silicosis.

MORBID ANATOMY

Grossly, the pathology of silicosis is one of generalized fibrous and pigment deposit. The inhalation of dust-laden air first produces a congestion along the lymphatics. The greatest evidence of this congestion is noted in the hilar lymph glands to which drain the lymphatics of the lung and pleura and at the lymphoid aggregations within the lung, where these lymphatics divide and intersect. The free silica particles are picked up in the terminal air spaces by the phagocytes, or dust cells, and transported by way of the lymphatics of these lymphoid areas within the lung and to the hilar glands. Excessive amounts of dust and prolonged exposure produce a piling up of these dust cells and a cellular reaction where they congregate. These areas of cellular reaction are chiefly lymphoid, and they gradually undergo a transformation as they are invaded by fibroblasts. This fibrotic replacement is proliferative in nature, and these areas enlarge, causing an increasing restriction to normal lymph flow. The fibrotic nodules become of such size that they grow together and may replace large amounts of normal lung tissue. Those close to the pleura gradually invade this tissue. When more or less generalized chronic infection develops, which is particularly invited by these disturbances to lymphatic drainage, the greater portion of the lobe involved may become one massive body of hard, dense, fibrous tissue. The fibrotic nodules involving the visceral pleura thus spread to the parietal pleura, and adhesions are formed. The centers of some of these hard, fibrous masses degenerate, and irregular cavities filled with cell debris and serous exudate are formed. This matrix constitutes an excellent media for the growth of bacteria. When the degenerative process extends to an area which is grown about one of the bronchi or larger bronchioles, it may drain and spread the infection to other portions of the lung. Some hard, fibrous masses become calcified either in whole or in part. Naturally, there is an excessive pigmentation of the lung, due to lymph stasis and inability of the lung to rid itself of such substances through the usual channels.

With the replacement of normal lung tissue by fibrotic tissue, such alveolar spaces as remain to function have an added burden. A varying amount of dilatation of the terminal air spaces is noted, both generally and frequently in localized areas, particularly in the most mobile portion of the lobe and near the pleura. These dilated air spaces may communicate and form blebs from 1 to 10 cm. across. Rupture of these huge air sacs has produced serious pulmonary hemorrhage and pneumothorax.

In conclusion, proper procedure to arrive at a diagnosis of silicosis requires correlation of all facts gleaned from the occupational and medical history, physical examination, laboratory and X-ray studies based upon our knowledge of the pathological changes characteristic of the disease.

The main discussion was given by **Dr. J. W. Miller**, United States Public Health Service, as a lantern slide demonstration. He stated that the pathology of anthracosilicosis is characterized by the presence of large amounts of coal dust in the lungs accompanied by an excessive amount of fibrosis. Grossly, the lungs are dark grey in color and are usually heavy. The coal dust appears to collect up to the subpleural connective tissue. In early cases a fine black linear network appears on the surface of the lungs where the dust has been deposited. In advanced cases thickening of the pleura is usually encountered. Scattered tough fibrous adhesions are featured. The involved lobes are distorted and contracted, the degree depending upon the amount of fibrosis present. Scattered areas show crepitus and often emphysematous blebs in the advanced cases. On section the appearance of the cut surface varies with the extent of the process. At first it is irregular throughout the lung, the nodules being most numerous usually in the more involved upper portion of the upper lobe. Between the black nodules the lung tissue appears more or less normal. These nodules become irregularly larger as the condition progresses and have the appearance and consistency of black rubber. Occasionally a central area of pasty noncaseous necrosis often with cavitation is present in these masses. The peritracheal and pulmonary lymph nodes are large, firm and black. Interlacing strands of grey fibrous tissue occur in their matrices. Matting of the lymph nodes is rare. Microscopically the black particles of coal dust are seen in macrophages in the alveoli. Collections of these dust-bearing macrophages are noted in the perivascular and peribronchial lymphatics. A fibrous hyperplasia is present along the lymph channels which in portions so increases as to form nodules that appear as concentric masses and irregular diffuse areas. The centers of the large nodules are often free of appreciable amounts of coal dust, but they frequently show hyaline degeneration and peripherally there are collections of dust-laden macrophages. When the nodules become confluent the peripheral depositions become enclosed in the larger nodule so formed. Areas of central amorphous, finely granular necrosis are sometimes seen. The essential pathology then is essentially a deposition of dust in the lung accompanied by an extensive fibrosis both diffuse and nodular with associated functional and degenerative changes.

In the further discussion, **Dr. Charles P. Cake** asked, "What is the progress in people having given up the hazardous occupation?" **Dr. Jones** stated: "We do not have much material on such patients. By reasoning, it seems that the pulmonary fibrosis is progressive and does not quickly disappear. I believe that cases of silicosis are slowly progressive and that men on hazardous duty, unless they have infection, should be allowed to continue working. Thus, other new men will not be infected." **Dr. Wallace M. Yater** asked, "Is this disease serious or common enough for miners to wear masks?" **Dr. Jones**, answered that no mask is good enough to keep out the dust. Masks that are made with such fine passages soon become clogged and this may cause emphysema. He recommends positive partial helmets for prophylaxis.

Presentation of Cases

The second part of the meeting was called to order in the histology room at 9:30 P.M.

Dr. Richard A. Kearny presented 2 cases of periorbital cellulitis secondary to sinusitis. The first was a boy, 6 years of age, who in 1935 had scarlet fever with pansinusitis. The left eye suddenly became swollen. Bacteria were found in the spinal fluid. The sinuses were drained by surgical operation, and an acute otitis media developed and was drained. The right eye became tightly swollen. Exophthalmos developed. The sinuses continued to drain, and the patient finally became well. Recently a tonsillectomy was performed. The second case was that of a 74-year old woman who had a history of an acute cold and a chronic sinusitis. The eyes became tightly closed. Exophthalmos began. Within 12 hours the eyes were transfixed. On X-ray examination the ethmoids, antrum and frontal sinuses were clouded. An operation was performed on the following day, opening of the sinuses being performed. Pus under pressure was found. The sphenoids were not involved. The patient is well today. In the discussion **Dr. Philip B. Matz** asked: "What is the usual organism in such cases?" **Dr. Kearny** answered that pneumococcus, type III, and streptococci were usually found. The organism itself is not of great importance as regards treatment. **Dr. J. G. Pasternack** thought that operative interference in such acute cases would seem to be a means of opening up new avenues of infection. **Dr. Kearny** answered that drainage is absolutely necessary if the eyeball is transfixed. Porter is thought to be the leading student in such cases. This type of interference is an exception to the rule of never operating on acute infection in the nose.

Dr. R. D. Lillie demonstrated slides of lung tissue from a monkey autopsy in which there were bronchial tubercles with caseous mucous material in the bronchi backing up into the alveoli. In the discussion **Major Raymond O. Dart** stated that he had never seen such a reaction in human tissues. **Dr. Lillie** thought that there was probably a catarrhal inflammation distal to the plugged bronchi. **Dr. Kearny** stated that in collapsed lungs following operations a bronchoscope is used and much mucus is extracted from the lungs.

Dr. L. L. Ashburn presented a case of a white male, aged 58 years, who noticed enlargement of the right axillary glands 2 years ago. Now he has general lymphadenopathy. The oldest gland is about the size of an egg. No other gland is larger than an olive. Blood count and Wassermann test are negative. On December 12, 1935, a small cervical lymph node was removed, and a diagnosis of lymphosarcoma, giant-follicle type, was made. On February 21, 1936, a large axillary node was removed. The previous diagnosis was confirmed on histopathological examination.

Dr. Ashburn presented a second case of a white male, aged 31 years, who gave a history of slow growth and progressive enlargement of the left cervical lymph nodes. The white cell count was 8,800. The Wassermann test was negative. A left cervical lymph node was removed March 2, 1936. Histopathological diagnosis of Hodgkin's disease, cellular type, was made. In the discussion **Major Raymond O. Dart** concurred with the diagnosis of both cases. **Captain DeCoursey** asked: "Do you feel that this process began as Brille-Symmers disease?" that is, a benign giant follicle hyperplasia. **Dr. Ashburn** answered that this slide was from a gland that was larger and also older than a previously excised gland, and that this section appears more sarcomatous than the previous one.

Dr. Vincent J. Dardinski demonstrated slides from a pedunculated tumor which was present on the head of a new-born baby over the posterior fontanel. The tumor was not covered by skin but only by a thin membrane. In the discussion **Major Dart** mentioned solid meningocele as a possibility, but that the cells were more suggestive of a glioma. He believed that the tumor would recur but would not metastasize. **Dr. Dardinski** first thought that the tumor was a lymphangioma. **Dr. J. G. Pasternack** said that the section looked like a cross-section of a very active Pacchionian granulation. **Captain DeCoursey** doubted that anything would happen to the child unless from secondary infection. **Major Dart** stated that the prognosis was definitely bad.

Dr. Wallace M. Yater presented slides of a dorsalis pedis artery from a colored male, aged 43 years, who 9 years ago began having spontaneous partial amputation of his toes so that now parts or all of several toes are missing. The Kahn test is positive and a syphilitic aortitis is present. He was treated for syphilis. A dermatitis developed on the feet and a dermatologist called it leprosy; there was anesthesia in the distal portions of the feet. Pulsation was absent in the dorsalis pedis and the posterior tibial arteries of one foot and in the dorsalis pedis of the other. A biopsy of a dorsalis pedis artery was made. The lumen was filled with dense fibrous tissues and new vessels. The media contained many small vessels. Arteriograms showed occluded dorsalis pedis and anterior tibial arteries of one extremity and of the dorsalis pedis in the other. There was no phlebitis clinically and no vein was removed. This must be considered a thrombo-angiitis obliterans in a negro, but syphilitic thrombo-arteritis must be ruled out.

Dr. Yater presented a second case of a white man, 30 years of age, who had thrombo-angiitis obliterans and died from lung and brain abscesses. Arteries removed at autopsy showed the end stages of thrombo-angiitis obliterans. In the discussion **Dr. Pasternack** remarked that the sections of the first case showed a very pretty capillary vascularization of the whole artery. The consensus was that the changes in the artery were consistent with those of Buerger's disease.

Dr. R. D. Lillie moved that the next meeting be held on the afternoon of the first Saturday of April.

The meeting adjourned at 10:35 P.M.

MEDICAL DEFENSE

At a recent meeting of the Executive Committee, Dr. Luther H. Reichelderfer was elected for a period of 3 years to succeed himself as a member of the Medical Defense Committee. This committee is functioning in a manner which deserves the commendation of the membership. Suits are being prevented. Members, and there are still too many who have no other protection than that offered by the Society's own committee, are defended when necessary in the courts at the Society's expense. Much success in cases reaching litigation has met the Society's efforts. Members are defended when certain constitutional provisions are met. The Society *does not* pay indemnities. Insurance is necessary for *indemnity* coverage. Chapter VII, Article IV, Section 5 reads:

> "Every active member of the Society in good standing, whose dues are paid before April 1st of any year, shall be entitled to the benefit of this section . . . ." Further, "Members entitled to and desiring the assistance of the Medical Defense Committee shall request such assistance in writing. As a condition precedent to such assistance, the member shall agree in writing that he will not compromise or settle his case without the consent of the committee and that the committee shall have complete control of the case . . . . A member desiring or receiving assistance from the committee shall immediately send to the Secretary of the committee every letter, process of court, or other evidence of a pending or threatened malpractice suit received by him and shall furnish such additional information in such detail and in such manner as the committee may require. Every member of the Society shall, on request, appear before the Medical Defense Committee and coöperate with it to the fullest extent in the investigation and the defense of any case, so far as he can ethically or legally do so." . . .

Improvement seems real in the District of Columbia in the matter of the number of suits filed and the results following court appearances. The capable lawyer who formerly accepted cases against physicians has been impressed with the determined defense in the courts to which malpractice allegations lead. This lawyer notes there is much less tendency on the part of the doctor to settle out of court in order to avoid the entailed publicity of a suit. The profession is rightly becoming litigation conscious, with the result that seemingly trite remarks or actions which might stimulate some money-seeking client to action are avoided. All members of the Society should again read Chapter VII, Article IV, Section 5 of the Constitution and assist the Medical Defense Committee in its efforts.

The personnel of the Medical Defense Committee is as follows: Drs. Luther H. Reichelderfer, chairman; Francis R. Hagner, John B. Nichols and Coursen B. Conklin, *ex officio*.

NEWS AND PERSONALS

Annual Scientific Assembly of the Medical Society of the District of Columbia, May 6 and 7. Register early, Wednesday, May 6. All registrants obtain complimentary tickets to the Mayflower luncheon. Scientific papers, dry clinics, exhibits—scientific and technical, motion pictures. The Public Meeting, to be held on the evening of May 6, will be addressed by Dr. William A. White, on the subject: "The Dependence of Modern Civilization Upon Health." Announce this to your clientele. Arrange your appointments for 2 days' attendance. See page xi, this issue, for complete details.

American Medical Association meets at Kansas City, May 11 to 15, 1936. Make your arrangements to go now. The Medical Society of the District of Columbia should be represented by a large quota. Our delegate in the House of Delegates, which convenes on Monday, May 11, is Dr. Henry C. Macatee. The following is a list of District of Columbia participants in the scientific program.

WALLACE M. YATER, LAURENCE S. OTELL, AND HUGH H. HUSSEY, JR. Hepatosplenography with Stabilized Thorium Dioxide Sol. A Follow-up Study of 200 Patients Examined Over a Period of 5 Years.

HOWARD F. KANE AND GEORGE B. ROTH. The Relief of Labor Pains by the Use of Paraldehyde and Benzyl Alcohol.

JAMES P. LEAKE. Poliomyelitis. Present Knowledge and Its Bearing on Control.

NORMAN P. SCALA, AND ERNEST A. SPIGEL, Philadelphia. The Cortical Innervation of Ocular Movements.

FRANCIS R. HAGNER. Inflammatory Occlusion of the Epididymis in Male Sterility.

WALLACE M. YATER will open the discussion on paper by Bayard T. Horton, of the Mayo Clinic, entitled: "Hypersensitiveness to Cold with Local and Systemic

Manifestation of a Histamine-like Character; its Amenability to Treatment."

GUY W. LEADBETTER will participate in the discussion of paper by Joseph I. Mitchell, Memphis, entitled, "Fractures of the Neck and Femur in Children."

CHARLES S. WHITE AND J. LLOYD COLLINS. Treatment of Empyema by the Cavity Packing Method. This scientific exhibit will consist of charts, motion pictures in color and models.

E. A. MERRITT, EDGAR M. MCPEAK AND R. RHETT RATHBONE, will have an exhibit on the application of the Contard principles of radiation therapy in malignancy.

American Medical Golfers Play in Kansas City, Monday, May 11, The American Medical Golfing Association, which has 1,150 members from every state of the Union, will hold its twenty-second annual tournament at the Mission Hills Country Club and the Kansas City Country Club in Kansas City on Monday, May 11, 1936. There will be 70 trophies and prizes. Present officers are: Drs. M. M. Cullom, Nashville, president; W. Albert Cook, Tulsa, and Walt P. Conaway, Atlantic City, vice presidents. All male Fellows of the American Medical Association are eligible and cordially invited to become members of the A. M. G. A. Write the Executive Secretary, Bill Burns, 2020 Olds Tower, Lansing, Michigan, for an application blank. Participants in the A. M. G. A. Tournament are required to furnish their home club handicap, signed by the secretary. No handicap over 30 is allowed, except in the Kickers' (Blind Bogey). Only active members of the A. M. G. A. may compete for prizes. No trophy is awarded a Fellow who is absent from the annual dinner.

The Annual Round Table Luncheon of the MEDICAL AND CHIRURGICAL FACULTY OF THE STATE OF MARYLAND will be held Wednesday, April 29, 1936, at 1:30 P.M. The cost of the luncheon is $1.00. Some of the subjects to be discussed and speakers follow: "The Present Status of Surgery in the Treatment of Pulmonary Tuberculosis," Thomas B. Aycock, M.D.; "The Psychiatric Scene," Ross McC. Chapman, M.D.; "Brain Tumors," Walter E. Dandy, M.D.; "Pneumonia and Its Complications," Louis Hamman, M.D., and Maurice C. Pincoffs, M.D.; "Vitamins in Pediatrics," C. Loring Joslin, M.D.; "Irradiation of Gastric Carcinoma," Charles A. Waters, M.D.

Send check for luncheon or inquiries to the Medical and Chirurgical Faculty, 1211 Cathedral Street, Baltimore, Md.

George Washington University School of Medicine was addressed on March 26, by Professor A. Lacassagne of the Radium Institute of Paris, who is in this country as the guest of the International Cancer Research Foundation of Philadelphia. His subject was, "A Presentation of Tumors in Rabbits Originating at the Sites of Former Foci of Inflammation Treated with Roentgen Rays." Lantern slides were used to illustrate his remarks.

The **Smith-Reed-Russell Lecture** on April 28 will be given by Professor Stuart Mudd, Department of Bacteriology, School of Medicine, University of Pennsylvania.

Dr. William Thornwall Davis succeeds the late Dr. William Holland Wilmer as national chairman of the 25th Anniversary Fund to secure $25,000.00 for the National Library for the Blind. Senator Thomas P. Gore is president of the Library.

Dr. Thomas Parran, Jr., becomes Surgeon General of the United States Public Health Service, succeeding Dr. Hugh Smith Cumming, retired. The new Surgeon General was graduated from the School of Medicine of Georgetown University in 1915. He was up to the time of his new appointment Commissioner of the New York State Department of Health.

Dr. H. H. Schoenfeld addressed the Medical Society of Columbia, South Carolina, on April 13 on the subject: "Ventriculography with Thorium Dioxide."

Dr. Arthur C. Christie will read a paper entitled, "Modern Conception of Irradiation Therapy in Malignancy," at the 85th annual session of the Iowa State Medical Society in Des Moines, April 30.

Dr. James T. Wolfe read a paper, "Bacterial Vaccine Therapy," at the Tri-State Medical Association meeting at Columbia, S. C., on February 17. The Council created a Committee on Respiratory Infections of which Dr. Wolfe was named chairman.

Dr. Wallace M. Yater will present a paper before the Section for the Study of Peripheral Circulation of the American Heart Association, in Kansas City, May 12, entitled: "Thorotrast Arteriography in Vascular Diseases of the Extremities." There will be an accompanying exhibit illustrative of the subject.

WOMAN'S AUXILIARY NOTES

The Woman's Auxiliary to the Medical Society of the District of Columbia wishes to thank the members of the Society for a most enjoyable evening on the occasion of the President's Address, April 8, in the Medical Society Building.

The Auxiliary participated in the flood relief organized by the District of Columbia Chapter of the Red Cross, contributing $100.00 to the fund for flood sufferers in the District of Columbia.

Annual Scientific Assembly, May 6–7

On Wednesday, May 6, the Woman's Auxiliary will give its annual luncheon at the Columbia Country Club. Mrs. Edward L. Morrison, President, will welcome the guests of honor, the wives of the visiting doctors attending the Annual Scientific Assembly of the Medical Society of the District of Columbia, May 6–7, from the Medical Society of Virginia, Maryland and the District of Columbia. Mrs. James G. Cumming, Chairman of the Social Committee, will be assisted by Mrs. F. A. J. Geier, Mrs. William P. Herbst, Jr., Mrs. William J. B. Orr, Mrs. Henry A. Hornthal, Mrs. A. Magruder MacDonald, Mrs. Herbert E. Martyn, Mrs. George C. Ruhland, and Mrs. Wallace M. Yater, who will be in charge of the "flying squadron" furnishing transportation.

Mrs. Henry A. Hornthal, Chairman,
Committee on Publicity

THE DAVIDSON LECTURE

THE SELECTIONS OF LECTURER FOR OCTOBER 13, 1937

The original resolution governing the conduct of lectures reads:

WHEREAS, The Medical Society of the District of Columbia will be perpetually indebted to DOCTOR EDWARD YOUNG DAVIDSON for initiating and guiding to a successful completion the project of building and owning its own Home, a project to which may be directly traced the present increasing usefulness of the Society to its members and humanity;

Resolved, That the Medical Society of the District of Columbia, being desirous of suitably expressing its deep sense of grateful appreciation of the priceless services rendered it by Dr. Edward Young Davidson in obtaining its present building and being no less interested in perpetuating this striking example of disinterested service and true loyalty from one of its members, hereby appropriates the sum of three thousand dollars ($3,000), or as much thereof as may be necessary, to establish and endow in perpetuity the DAVIDSON LECTURE. This lecture shall be given biennially by a physician or other scientist who shall be nominated one year in advance by the Executive Committee. For his services he shall receive an honorarium of three hundred dollars ($300); and be it

Further Resolved, That the Executive Committee is hereby directed to have prepared a suitable tablet commemorating the establishment and purpose of the Davidson Lecture, and to cause the same to be erected in the Building; and be it

Further Resolved, That the Executive Committee is hereby directed to have a copy of these resolutions engrossed on parchment and to forward the same to Doctor Davidson.

A resolution affecting honoraria was adopted on May 3, 1933, as follows:

That the Davidson Lecture Fund be invested in United States Government Bonds and that subsequent to January 1, 1934, the honorarium presented to the physician giving the Davidson Lecture shall be equal to the income derived from these bonds. This amount of money to be in lieu of the $300.00 provided in the original Davidson Lecture Resolution of May 1, 1929.

At a meeting of the Executive Committee held January 27, 1936, the following policy for the selection of lecturer for 1937 was adopted:

"The selection of the Davidson Lecturer shall be on the basis of competition, the winning essay to be selected by a subcommittee consisting of five (5) members of the Executive Committee appointed by the Chairman. No member can serve on the committee who may desire to compete.

The competition shall be thrown open to physicians or other scientists working in the District of Columbia.

The essays to be submitted must bear no indication of the author's identity, being signed by a nom de plume. The identification of the author must be in a sealed envelope bearing on its surface the same nom de plume. No essay may be submitted that has been published.

Essays should be submitted to the Secretary of the Medical Society of the District of Columbia not later than the first of July of odd number years.

In case no essay is found worthy of an award, the subcommittee shall declare no award; the lecturer then to be selected by the full Executive Committee."

A further amendment recommended to the Society was the striking out of the phrase "*one year in advance*" in the sentence reading: "This lecture shall be given biennially by a physician or other scientist who shall be nominated *one year in advance* by the Executive Committee. . . ." as in original resolution. This was adopted by the Society on February 5, 1936.

It is well for all members or others interested to read carefully the foregoing. If the submission of a paper is contemplated fulfil to the letter the requirements. Original investigative work is especially desirable. Address all communications to the *Secretary*, Medical Society of the District of Columbia, 1718 M Street, N. W., Washington, D. C. Papers will be rejected which are not submitted in the manner outlined above.

There have been three previous lecturers:

1931: William Hallock Park, M.D., New York City. "Antipoliomyelitis Serum in Horses and Human Beings and Its Use in the Prevention and Treatment of Poliomyelitis."

1933: Edwin A. Merritt, M.D., Washington, D. C. "X-ray Treatment of Bone Conditions Produced by Hyperparathyroidism."

1935: George C. Ruhland, M.D., Health Officer, District of Columbia. "The Newer Public Health."

The importance of the work of the Davidson Foundation is growing. The opportunity for participation on October 13, 1937, is now open.

"Traumatic Perforation of the Bladder. Observations Based on Experience with 10 Cases," W. Calhoun Stirling, M.D., Urologic and Cutaneous Review, 1936, Vol. 40, No. 3.

"Traumatism of the Kidney. Report of 27 Cases. An Experimental and Clinical Study," W. Calhoun Stirling, M.D., British Journal of Urology, March, 1936.

"Adrenal Insufficiency Resulting from Partial or Total Atrophy of the Adrenal Glands. Early Clinical Recognition," G. Louis Weller, Jr., M.D., Archives of Internal Medicine, February, 1936.

"Factors in the Differentiation of Pernicious Anemia from Related Deficiency Diseases," G. Louis Weller, Jr., M.D., Medical Papers Dedicated to Dr. Henry A. Christian, February, 1936.

"Clinical Aspects of Destruction of the Adrenal Glands," G. Louis Weller, Jr., M.D., Virginia Medical Monthly, January, 1936.

"Pathogenesis of Recurrent Vomiting," G. Louis Weller, Jr., M.D., Archives of Pediatrics, July, 1935.

EXCERPTS FROM LETTERS*

A. Sometime Patient to Doctor:

"The bill is not being paid because I am convinced that I do not owe it. When I visited your office you diagnosed my condition as . . . . and prescribed . . . . after which I was again to call at your office. After a couple of days . . . . I could see that your prescribed treatment was greatly aggravating the condition. I then called upon an other physician, who correctly diagnosed the condition . . . . Subjected to correct treatment the infection healed within a short time. If I had continued as per your instructions it is possible . . . . I would have suffered loss of time as well as the danger of further complications."

B. Doctor to Government Chief of Department in which Patient is Employed.

The request is made that erstwhile patient be "impressed with the obvious fact that he is morally and legally bound to pay the bill in question, for the following reasons: First, it is well known to a majority of intelligent laymen, and it has been repeatedly decided by the courts, that a physician does not have to cure, or even benefit, his patient to be entitled to a fee. Briefly, in the last analysis, the physician is paid for *trying*, not for *doing*. All that is required is that he be legally qualified to practice, possess reasonable skill, and examine and prescribe for his patient with conscientious care and in good faith. This judicial attitude is doubtless based upon the consideration that medicine is not a trade, like that, for example, of the automobile mechanic, but is an extremely complex profession having to do not only with the known, but with the unknown and the unknowable, and that, therefore, it would be the acme of injustice to require *omniscience* and *infallibility* in a medical practitioner in order to entitle him to a fee for his service. Reasonable skill and conscientiousness, therefore, have been fixed as the only prerequisites. As I am a graduate of a strictly Class-A medical college; am licensed to practice in the District of Columbia; . . . am a member of several well-known medical societies; am a member of the staffs of four of the leading hospitals of Washington, and have had 10 years' experience in the exclusive practice of my specialty, during which I have treated with apparent success many persons of national and international note, such as members of the European royalty, foreign diplomats, eminent scientists, governors, senators, congressmen, etc., it would appear that I possess the qualifications entitling me to a fee when I examine and prescribe for a patient. True, I may not rise to the heights of Mr. ——'s professional standard; but I am at least entitled to a fee.

"In this connection, it should be pointed out, as germane to the question at issue, that if Mr. —— had fulfilled the obligations of a patient to a strange physician, by paying then and there for the consultation obtained, he would not now find himself under the necessity of bringing forth either real or fanciful reasons for not paying for service received more than 5 months ago. Mr. ——'s alibi is very old and trite—very familiar to every medical practitioner. . . .

"Mr. ——, after disregarding my instructions to return to my office if not improving, and after discharging himself from my care without notifying me, and without paying his bill as required by ethical usage, now has the injustice to charge me with a lack of interest in his case! No comment is necessary.

"Mr. —— has received from me, and discourteously ignored, no less than 6 polite requests to pay this small bill. But, on his own admission, he belongs to that class of individuals who think that they can consult a physician without *owing* him anything. Because of the principle involved, I respectfully request that you endeavor to impress upon Mr. —— the unfairness and injustice of his attitude, and direct him to settle this account."

The bill was paid.

Charles Bell, M.D.

(1877–1936)

Dr. Charles Bell, who was graduated from Georgetown University in 1902, and who served in the United States Public Health Service 1909–1913, and later in the United States Army 1917–1919, died on February 27, 1936. He became an active member of the Medical Society of the District of Columbia in 1920; his status being changed to associate in 1923. Appropriate memorial tribute will be prepared by a committee consisting of Drs. Caryl Burbank, Chairman, Frederick Yates and Joseph A. Jeffries.

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* In Editor's Mail. Anent the one-visit patient

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ANCIENT AND MODERN KNOWLEDGE CONCERNING ANAL FISTULA

LOUIS A. BUIE, M.D.
Section on Proctology, The Mayo Clinic, Rochester, Minnesota

It is surprising that confusion still exists concerning the cause and management of anal fistula. Discussions of anorectal disease appear in the earliest records of medical history and the subject of anal fistula figures prominently among descriptions of operative procedures. Almost 2,000 years ago Celais excised fistulas with a bistoury, and Hippocrates, in 400 B.C., described an examination of a patient in the course of which he used a rectal speculum made of shell. The surgical treatment of imperforate anus was mentioned in the Talmud and a fee for services rendered to those suffering with intestinal disease was prescribed in the code of Hammurabi, 2200 B.C. Fistulectomy was described by Albucasis in 1013 A.D., and Guillermo of Saliceto, in the twelfth century, indicated his preference for the use of the cautery in treatment of anal fistulas.

In the fourteenth century John Arderne prepared a monograph on anal fistula. His operation was clearly a modification of that which had been recommended by Albucasis 400 years previously. It was worthy of his effort, and with few alterations it is the same as that which is generally being used today. His operation consisted chiefly in opening the tracts from their source to their termination, and by this method he cured many patients. He was an alert and aggressive man and publicized his work thoroughly, but the minds of his contemporaries were not ripe for reception of his teachings, and it was nearly 500 years after his death before their value was recognized.

According to Hume, King Henry V of England, in 1422, suffered with an anal fistula which the surgeons of that day had not the skill to cure, and as a result he died in the thirty-fifth year of his life.

More than 400 years after the death of John Arderne, Dionis wrote about an operation on King Louis XIV for anal fistula. At first the proposed operation was rejected and after 20 days of applying plasters and hot stones the abscess opened. For a year following this the fistulous tract opened and closed at intervals. Many forms of treatment and witchery were tried out on such of the king's subjects as could be found to be suffering with the same disorder. Finally Monsieur Bessiéres, the surgeon of Paris, advised operation. Methods of ligature, cautery, and excision were described to the king and he chose the method of excision. The operation was performed on November 18, 1687, by Monsieur Felix, who used a bistoury fashioned after the type of syringotome originally invented by Galen. It was a simple, curved instrument with a narrow blade of silver. The wound failed to heal following the operation and a second operation was performed on December 6, 1687. The patient was in condition to take his first walk on January 11, 1688, and the wound remained healed. An interesting commentary, which might be considered parenthetically at this point, is the fact that anal fistulas became rather popular among members of the king's court for several years following this experience. Whether they were real or imaginary is not discernible from the available sources of information.

The position in which those who are unfortunate enough to have ischiorectal abscesses and anal fistulas find themselves in our generation is not unlike that of those who were similarly afflicted centuries ago. Rarely are patients seen nowadays who have not been put through several "preliminary" operations before a cure is established. Part of the confusion is attributable, in all probability, to a faulty conception of the origin and course of the disease. Improper terminology is partly responsible for the difficulty. The terms "rectal" and "anal" as applied to fistula are used interchangeably, whereas their meaning is entirely different and they should be carefully distinguished one from another. An anal fistula always originates as an infection in the anal crypts and extends outward, where it ultimately involves the ischiorectal space. Here, either rupture or surgical incision establishes the secondary opening on the surface of the body or within an adjacent viscus. At this point I emphasize the importance of using accurate terms in describing the openings of the fistula. In order to accomplish this, permit me to suggest an alteration in the present use of terms as applied to the opening at the source and that which is found at the termination of the process. Instead of "internal" and "external" I would suggest that the terms "primary" and "secondary" be used. An internal opening may be either at the original point of invasion of the tissues or it may be at another point where the tissues have been secondarily involved. This secondary involvement may be higher in the rectum than the primary one, and after an abscess has formed, it may rupture through the intestinal wall. Therefore, there are for consideration two internal openings but one is primary and the other is secondary. An external opening is always secondary, but the secondary opening may be either internal or external. When the primary opening is referred to, always that opening is indicated which is found behind the pectinate line in an anal crypt. By the secondary opening is always meant that point at which the fistula has terminated, either on the surface of the body or within the cavity of one or more of the viscera within the pelvis or lower part of the abdomen.

At about the sixth week of embryonic life the hindgut projects downward and the proctodeum dimples in toward the perineal body. These structures finally unite to form the anal canal. The line of union forms itself into a serrated margin which in the adult lies from 1 to 2 cm. internal to the anal verge. Here the skin overlaps the mucous membrane and forms papillae which are the shape of sawteeth, and crypts which lie between longitudinal folds of the lower rectal mucous membrane. This mucocutaneous line of union is known as the "pectinate line" or "linea dentata," and all of these structures, including the columns, the crypts, the valves, and the papillae bear the name of Morgagni who first described them.

The crypts of Morgagni are of most concern in discussion of anal fistulas. Examining them microscopically one often finds ducts surrounded by lymphoid tissue, and in all this region there is a generous lymph supply. The crypts and the adjacent papillae are susceptible to trauma during the daily bowel movement, as a result of the passage of a hardened particle of feces, bone, large formed stools, explosive watery stools, and so forth.

These structures are traumatized and infecting organisms are admitted. As a result of this invasion inflammatory changes involve the crypt and a focal point develops, or a papilla may become enlarged with edema and seal itself over the crypt, thus forming the abscess. It must be understood that this abscess is of microscopic proportions and exists within the anal canal; thus, it is different from another abscess which usually occurs in the ischiorectal space at a later stage in the development of the fistula. With the formation of this nidus, the first stage in the development of anal fistula has been passed. If this is kept in mind it should be possible to avoid the common error of vainly searching for the primary opening of these tracts above the level of the pectinate line.

The second stage in this development is the process of burrowing, and the infection may extend (a) subcutaneously and superficial to the anal muscles, (b) through the muscular structures themselves, (c) between the internal and external sphincter muscles, or (d) upward beneath the mucosa of the rectum without first passing into the ischiorectal tissues. The most frequent course for this burrowing process to follow is either through or between the anal sphincter muscles.

The third stage consists in the development of the ischiorectal abscess. This may occur in the muscular tissues in the region of the rectum or in the spaces or loose tissue of the ischiorectal fossa. As a result of the infection, the muscles are thrown into a state of spasm as the burrowing process progresses toward the ischiorectal space. Because of this there is sufficient interference to prevent evacuation of the pus through the original channel and, therefore, the abscess increases in size until it either ruptures or is opened by incision.

With rupture or incision the fourth stage is established and the anal fistula is complete. From this description it is apparent that there can be no such thing as a blind internal or blind external anal fistula. The term "fistula" implies the existence of two openings and unless the tract is completed no fistula is possible and the term "sinus" is preferable. If the process has only one opening it should not be called a "blind anal fistula" but should be considered merely as a blind anal sinus. There is no such thing as an incomplete external anal fistula.

The development of a blind anal sinus is explained on this basis. Some infections are more virulent than others, and in certain unusual instances the infection may be of sufficient virulence to destroy enough of the muscle to nullify the effect of their spastic reaction. In such an instance, therefore, the purulent discharges may be expelled at their source. Parenthetically, it may be noted that such a development cannot be cured until the sinus is converted by surgical incision into a fistula.

Various classifications of anal fistula have been made, but this presentation does not concern itself with that phase of the study and nothing will be said about it, inasmuch as it bears little relation to the origin of the condition or to its treatment.

A discussion of this disease would not be complete without some reference to the significance of tuberculosis in its relation to etiology. It is scarcely possible to offer any statement as to the exact percentage of fistulas which are of tuberculous origin because of the irregularity of the criteria which are used in determining this factor. If bacilli of tuberculosis could be found with any degree of frequency in the tissues taken from tuberculous fistulas, if tuberculosis would develop in all guinea-pigs which received injections of materials from tuberculous fistulas, or if it were possible to believe that because a patient has active pulmonary tuberculosis a fistula of the same individual would necessarily be tuberculous, there would be less difficulty. The discovery of bacilli of tuberculosis in tissue removed from a tuberculous anal fistula is so rare as to be a pathologic curiosity. Few patients who have anal fistulas have active pulmonary tuberculosis. Colon bacilli are numerous in the materials taken from these tracts and as a result many guinea-pigs succumb following injection before evidence of tuberculosis develops. It is probably sufficient to state that in contradistinction to the belief that most anal fistulas are tuberculous, tuberculous fistulas make up a very small percentage of those which are seen in the experience of the average physician. The figure should be estimated at about 3 per cent.

Treatment of this disease is surgical and embodies two chief factors: (1) Conversion of all fistulous tunnels into open ditches with all margins dissected away in such a manner as to prevent accumulation of infectious intestinal discharges within the recesses of the wound; (2) avoiding the time-worn practice of packing wounds. Dressings are removed from the cavity of the wound while its margins and walls are raw, as is indicated by bleeding when the dressings are removed. Removal of these packs should be begun within 48 hours following operation and should be completed as soon as possible. Thus, it is assured that the wound will heal, wall against wall, and that ultimately a block of scar tissue will be formed to which the muscle fibers will adhere. In that manner the anal sphincters will be able to exert a force on this block of scar tissue which will close the orifice at the outlet of the rectum with the same degree of efficiency as that they would display if the muscle fibers themselves were continuous.

EPIDEMIC POLIOMYELITIS IN WASHINGTON*†

CLINICAL SURVEY WITH EMPHASIS ON DIAGNOSTIC FEATURES

Alfred L. Abrams, M.D.
Washington

Of a total of 65 cases of acute anterior poliomyelitis reported in the District of Columbia in the period July 1 to September 30, 1935, 40 were admitted to the Children's Hospital and form the basis for this report. Although earlier diagnosis in this disease holds at present no implication for more hopeful final result, it is extremely important for the protection of possible contacts. We no longer regard poliomyelitis as a disease of the nervous system, but see it as an acute general infectious disease which must be diagnosed in its acute general infectious period rather than in the paralytic stage. We have, perhaps, as may appear later, forced the pendulum and over-diagnosed, but our final result and aim has more than justified any wayside error. Most of these cases were observed personally in the admitting room or on the wards, and this report is intended to present almost entirely a clinical experience without any attempt at reworking the literature.

Maintaining its reputation as a disease of late summer and early fall, poliomyelitis struck chiefly in August and September. As against one fifth of our total cases in July, August gave us more than a third, while September brought us nearly half. Only 1 case occurred in October.

Although past experience has found greatest involvement among children from 2 to 4 years, many of our cases were in older age groups, especially 6 to 9 years. Only a fifth of our series topped the latter figure (Table 1).

Sex distribution was exactly equal, and because of the smallness of our series, the equal race division of colored and white, compared to our normal 60-colored, 40-white admission ratio, is unimportant.

The chief complaint in any group of cases is extremely important as an orientating factor, sharpening our focus and limiting our field, and subconsciously establishing future diagnostic standards. Aside from paralysis, the presenting feature in over a fourth of the cases, severe headache (in 15 per cent), and severe generalized aches and pains which involved extremities, abdomen and neck (in 12½ per cent), were the outstanding reasons for parents bringing their children to the hospital. In 7½ per cent abdominal pain stood foremost. Neck pain involved a similar number. Vomiting, fever and drowsiness were paramount each in 5 per cent, while a scattering of individual cases presented back pain, convulsions, delirium and stupor (Table 2). The chief complaint, aside from paralysis, varied from 1 to 4 days in duration, the majority falling within 2 days preceding admission.

Expanding from the single chief complaint to the historical half of the admission syndrome, we find, again disregarding the obvious paralysis, an ever-recurring combination of fever, headache, vomiting, pain in spine and neck, and pains in the extremities.

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* From the medical services of the Children's Hospital, Washington, D. C.

† Read before the Society, February 26, 1936.

Searching the physical half of the admission syndrome, we discover most frequently some degree of stiffness and tenderness of the neck, tenderness and stiffness of the lower dorsal and lumbar spine, depressed or absent knee jerks, and fairly frequently absence of abdominal reflexes. Our composite picture, then, shows us a 5-year old child, perfectly well until 2 days before, when he complained of headache and generalized aches and pains, vomited several times, and was noted to be feverish. On admission he exhibited stiffness and tenderness of neck and spine, absent knee jerks, and depressed abdominals.

A detailed percentage analysis reveals fever in over 90 per cent; neck and back pain, and headache and vomiting, in close to 50 per cent; painful extremities in 30 per cent; paralysis in 27 per cent; and other complaints in lesser proportion. Changes in the knee jerks were observed in 43 per cent (Table 3).

TABLE 1

AGE INCIDENCE

AGE, YEARS	TOTAL	PER CENT
0–1	0	0.0
1–2	5	12.5
2–3	4	10.0
3–4	4	10.0
4–5	2	5.0
5–6	3	7.5
6–7	5	12.5
7–8	5	12.5
8–9	4	10.0
9–10	2	5.0
10–11	1	2.5
11–12	2	5.0
12–13	2	5.0
Over 13—26-year white female	1	2.5

In retrospect, most of the cases were strikingly alike, differing only in emphasis on various manifestations. This similarity probably accounts for our diagnostic accuracy, from one point of view, being so high. Of the 40 cases only 2 were admitted under other diagnoses. The first, a colored boy of 1 with a 4-hour story of projectile vomiting on attempted feeding, exhibited a temperature of 103°F., markedly hyperactive deep reflexes and bilateral ankle clonus. In view of a previous clinic X-ray suggestive of hilar tuberculosis, he was labelled tuberculous meningitis. Spinal-fluid findings were more characteristic of poliomyelitis, subsequent chest plates were negative, and he recovered completely. The second, a 7-year old colored girl, came in with a story of fever, vomiting, 2-stage abdominal pain, and exhibited marked tenderness and spasm localized at McBurney's point. The ward resident found practically the same features soon after the admitting man had seen the case, but 3 hours later abdominal signs and symptoms had vanished,

TABLE 2

INCIDENCE OF PRESENTING SYMPTOM

SYMPTOM	CASES	PER CENT
1. Paralysis	11	27.5
2. Headache	6	15.0
3. Generalized aches and pains	5	12.5
4. Abdominal pain	3	7.5
5. Neck pain	3	7.5
6. Drowsiness	2	5.5
7. Vomiting	2	5.5
8. Fever	2	5.5
9. Back pains	1	2.5
10. Convulsions	1	2.5
11. Delirium	1	2.5
12. Stupor	1	2.5
13. No history	1	2.5

TABLE 3

ADMISSION SYMPTOMS AND PERCENTAGE OCCURRENCE

SYMPTOM	CASES	PER CENT
1. Fever	37	92.5
2. Pain in neck and back	21	52.5
3. Headache	20	50.0
4. Irritability	20	50.0
5. Vomiting	16	40.0
6. Pain in extremities	12	30.0
7. Drowsiness	11	27.5
8. Paralysis	11	27.5
9. Abdominal pain	7	17.5
10. Anorexia	7	17.5
11. Sore throat	6	15.0
12. Sensorial difficulties	4	10.0
13. Constipation	4	10.0
14. Dysphagia	3	7.5
15. Nasal regurgitation	2	5.0
16. Nasal voice	2	5.0
17. Diarrhea	1	2.5
18. Convulsions	1	2.5

and a tap characteristic of poliomyelitis was obtained.

But from another point of view our diagnostic accuracy was far less. Of 63 cases admitted as poliomyelitis, only 38, or 60 per cent, were proved to be that disease. Perhaps we had become too "polio-minded," but in view of the danger of letting a case slip by, we feel our extreme caution justified. Nine of the 25 admitted as poliomyelitis had negative spinal-fluid findings and were discharged in the tonsillitis-pharyngitis group. These cases presented fever, headache, vomiting, generalized aches and pains, and occasionally tender extremities, but in general offered few physical signs and were indistinguishable clinically from our abortive cases of poliomyelitis. Of 2 cases proving later to be malaria, both exhibited fever, vomiting, generalized aches and pains, and 1 had a stiff neck. Two cases of epidemic meningitis were indistinguishable except by spinal tap. On some of the cases we hedged, admitting them as poliomyelitis or meningitis, waiting for the spinal tap for conclusive evidence. One case of pyelonephritis exhibited fever, vomiting and absent knee jerks; another fever, headache, drowsiness and dysphagia, the last symptom being explained by an associated sore throat. Our microcephalic idiot came in with convulsions, afebrile and should probably not have slipped by as a poliomyelitic. One case was admitted with a scattering of paralyses, died in the Drinker respirator, and was cleared up at autopsy as a septicemia with miliary abscesses. Two toxic cases of diarrhea, cause undetermined, exhibited fever, headache, vomiting, convulsions and drowsiness, and 1 had a stiff neck. These possibly, in retrospect, might have been better diagnosed, since diarrhea has proven a fairly uncommon finding in poliomyelitis. Only 1 of our authentic cases of poliomyelitis exhibited a diarrhea of a very mild type. One case with flaccid paralysis of an arm showed a 4-plus Wassermann in the spinal fluid. Of 2 cases presenting the usual general features, plus painful stiff neck, 1 turned out to be cellulitis with toxemia, the other erysipelas with toxic psychosis. A family physician sent us a 12-year old girl with fever, dizziness, and pain on motion of the lumbar spine. In spite of our admission diagnosis of acute rheumatic fever, we were obliged, in view of his referral diagnosis of poliomyelitis to do a spinal tap. Autopsy 3 weeks later revealed subacute bacterial endocarditis in a rheumatic heart. And finally, our last diagnostic sin was in the admission of a child with fever, headache, stiff neck and spine, and absent deep reflexes, who had a normal spinal fluid but a positive Widal reaction. In looking back over this extremely interesting group of cases admitted for poliomyelitis and later proving to be something else, we feel that, put again in the same situation, we probably would again, in most of the cases, proceed in the same way—do a diagnostic spinal tap to rule out poliomyelitis.

This problem of tapping raises a number of questions difficult to answer. Shall we tap every suspect? What constitutes a suspect? Are we doing the child an injustice to tap on suspicion? Shall the tap be done in the home or the hospital? We believe that any suggestion of poliomyelitis calls for a tap. If, in the borderline case, the question of poliomyelitis enters the mind at all, a tap is essential. We believe that the simplicity and safeness of the procedure does away with any question of injustice, and that it would be a far greater injustice to the community to let 1 of these cases slip by. We believe that in this case the greater common good must be our guiding principle. And to make the procedure as fool-proof as possible, we believe that the tap should, whenever feasible, be done in the hospital.

Diagnosis by means of the spinal-fluid examination raises the question of the dividing line—what cell level shall we fix as normal, what abnormal? We were fortunate in having in our series fairly clean-cut cases as judged by the tap. The lowest count in any of the cases classified as abortive was 13, well above the usually accepted upper limit of normal at 6, or, as stated by some writers, 10 in children. Some of our spinal paralytic cases presented lower counts, 5 within normal range, but the clinical features here were sharply defined. We felt that with a total count over 12, with the spinal fluid negative on smear and culture (done routinely), regardless of the presence or absence of weakness or paralysis, we were dealing with poliomyelitis, that is, an acute infectious, communicable disease requiring strict isolation. In 70 taps done on these 40 cases the total count ranged from 2 to 640, with lymphocytes varying from 20 to 100 per cent. The bulk of the total counts lay between 7 and 100, whereas the bulk of the lymphocyte percentages lay between 11 and 30. This predominance of polymorphonuclear leukocytes is at distinct variance with findings in past epidemics. Only 2 of the fluids were reported as slightly cloudy, 84 per cent were under normal pressure, estimated grossly, while 14 per cent were said to exhibit a moderate rise. Globulin was increased in 75 per cent of the taps, normal in the rest.

Following the standard classification, 40 per cent of the cases fell into the abortive group, never exhibiting any paralytic features. One case is described as meningitic, none are classified as cerebellar, 10 per cent are termed bulbar, and the remaining 45 per cent which exhibited spinal paralysis at one time or another, regardless of final outcome, are called spinal.

Dividing the cases by type of onset, 95 per cent fall into the continuous group, the remaining 5 per cent which exhibited remission and exacerbation are grouped as "dromedary."

Prodromes were practically inseparable from symptoms of the disease. Previous or intercurrent colds were conspicuously absent.

The duration of acute symptoms varied from 1 to 7 days, 3 days constituting a fair average.

Paralysis developed at some time in 55 per cent of cases. Lower extremities were involved in 30 per cent, uppers in 12.5 per cent, uppers and lowers in 7.5 per cent, and head and neck (bulbar) in 10 per cent. Of the 18 cases exhibiting spinal paralysis at some stage, 3 cleared up completely and 1 died. Of the 4 cases showing bulbar signs, 3 died and 1 recovered without residual. Thus 75 per cent of the deaths were in the bulbar group. Our results to date show 32.5 per cent of the 40 cases with residual paralysis, 52.5 per cent without residuals, and a mortality of 10 per cent. This mortality figure includes 1 adult case, subtraction of which leaves a total mortality of 7.5 per cent for our children's group. Maximal paralysis developed any time from the first to the twenty-fourth day after onset, with the peak from the third to the seventh day.

Hospitalization extended in most cases beyond the 14 days' afebrile isolation period, and varied from 1 day to 9½ weeks, most patients staying from 2 to 3 weeks.

One striking finding, in comparison with past reports, was the generally high admission temperature. The great majority of cases attained peak temperature within the first 24 hours after admission and most of these ranged from 103°F. to 105°F. However, this high admission temperature seemed to give a more favorable prognosis, for of 15 cases running between 103°F. and 105°F. only 4 had residuals or an otherwise unfavorable outcome. Temperature elevation lasted in most cases from 1 to 4 days.

Minor laboratory findings included: Anemia in 15 per cent; polymorphonuclear leukocytosis in about half of a small group counted, with an occasional lymphocytosis. A trace of urinary albumin was found in 12.5 per cent.

Whenever possible, transfusion of adult blood was done, about half the patients receiving transfusions varying between 1 and 5 in number, and of 100 to 250 cc. of blood at a time. No great difference was noted in comparative results in transfused and nontransfused groups. There were 8 abortive cases in each. In the spinal group, 7 out of the 10 transfused had residuals, whereas in the nontransfused group, 7 out of 7 had residuals and 1 died. In the transfused bulbar group, 1 of 2 died; in the nontransfused group, 2 out of 2 died.

Later treatment included splinting of 9 of the 13 paralyzed limbs in the acute stage, and initiation of physiotherapy in 4 cases any time from

18 to 70 days after the onset of acute symptoms. Two patients put in the Drinker respirator, and 1 in an oxygen tent, died.

Chickenpox complicated 2 cases, scarlet fever 1, and positive throat culture for c. diphtheriae 3, with no effect on the primary process.

In conclusion, we feel quite definitely from our results that the diagnosis can and should be made in the majority of cases without the presence of paralysis and that the inconvenience of a spinal tap is far outweighed by the protection afforded the community.

MESENTERIC VASCULAR OCCLUSION*

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This pathological entity was first described by Tiedeman in 1843. Virchow in 1847 described the morbid anatomy in detail. In 1913 Trotter published his Cambridge monograph in which he brought together all the work done since 1847 and reported 360 cases from his own series and from the literature. Since that time the volume of writing on the subject has been tremendous.

The presence of mesenteric thrombosis due to heart lesions has been emphasized since the early literature. The history of valvular pathology followed later by embolic phenomena is known to all. Conner states that atherosclerosis is common in the mesenteric arteries, and he believes that thrombosis, especially of the smaller arterial branches, is of much more frequent occurrence than its clinical recognition.

In recent articles several predisposing conditions have been stressed, the existence of which along with symptoms of "acute or subacute obscure abdominal distress" should always make one consider the possibility of circulatory damage to the bowel. These may be grouped roughly into four major groups: Infectious, hematogenous, traumatic and mechanical abdominal lesions. However, as Eliot says, in a very considerable proportion of cases no adequate cause can be discovered. While the etiological importance of certain diseases must always be recognized, the fact that occasionally not one can be identified must not be overlooked and must not lead to the positive exclusion of mesenteric thrombosis in the diagnosis of the acute abdomen.

Loop gives an excellent description of the appearance of mesenteric thrombosis at operation: "(1) Transparent, sticky, peritoneal fluid, amber or blood-tinged, and without coagulated lymph. (2) Cyanosed, plum colored, soggy, edematous intestine, with glistening peritoneum free from adhesions, its lumen relaxed (not distended) to large caliber, lying inert within the abdominal cavity, with no tendency to crowd out of the incision, held down by the weight of the fluid within its lumen, containing but little gas. The mesentery forms a thick, doughy mass dragging down over the pelvic brim as though adherent. Actually, it is delivered with ease." Other writers have referred to the bowel as resembling a rubber hose.

The two most common causes are thrombosis (arterial and venous) and arterial embolism. Donaldson and Stout believe that arterial and venous mesenteric thrombosis should be recognized and described as separate clinical entities, and that the profession "should discard the prevalent hopelessness which has been too often attendant upon the possibility of a correct preoperative diagnosis of mesenteric thrombosis."

Venous thrombosis is colored by the underlying pathological picture, since it is generally a complication of a primary abdominal process, as typhlitis, trauma, ileus, etc. "Generally speaking, however, the onset and course would seem to be relatively slow. Unless the possibility is kept in mind it will invariably be very difficult to recognize it as a definite surgical indication in its earlier stages when surgery should offer an excellent chance for recovery."

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* From the Emergency Hospital, Washington, D. C.

The dramatic onset of mesenteric arterial embolism (although easily confused with the suddenly developing obstructive syndrome) should be possible to differentiate from the venous obstructive type. Warren and Eberhard explain in part this difficulty by calling to mind the seldom appreciated fact that this difference in speed of events may not be observed clinically due to the extraordinarily great compensatory powers of the body. Compensation may be able to care for a slowly failing circulation up to a certain point without symptoms, but finds itself suddenly unable to carry on further, whereupon the typical acute symptoms appear without warning although the process has been going on for some time.

In venous thrombosis the condition may be primary in the mesenteric veins and ascend into the larger radicals, or the reverse may occur. Of especial importance in primary occlusion are intestinal changes that permit entrance of bacteria into the vascular channels, such as enteritis, the puerperal state, appendicitis and other suppurative diseases of the peritoneal cavity.

The sudden impact of an embolus from a diseased heart produces a marked ischemia of the distribution area of the artery infarcted. Boyd states that the sudden anemia produced by an acute blockage of a branch of an artery sets up so violent a spasmodic contraction of the bowel musculature that the part becomes isolated from the neighboring circulation. This probably explains why gangrene occurs in the face of an apparently profuse blood supply when it seems that the vessels above and below should be able to carry on the work.

Sneierson states that the preponderance of superior mesenteric artery lesions is due to the fact that it is larger than the inferior, it comes off above the inferior and almost parallel to the aorta while the inferior comes off nearly at right angles. As a result it is more likely to intercept an embolus. The decrease in the size of the vessels in the lower ileum due to the numerous secondary loops may also play a part.

If the belief of Conner is true, that occlusion of small branches of the mesenteric vessels is quite frequent, one may be justified in the diagnosis of vascular occlusion in cases with acute abdominal pain and partial obstruction which clear up within a short time. Such a history is frequently obtained from old arteriosclerotic individuals. The following history is rather typical:

Case 1: A. C. D., a white man, aged 62 years, was admitted on October 10, 1935, on the service of Dr. F. H. Morhart with the chief complaint of lower abdominal pain, nausea and vomiting. Two days before hospitalization he developed a sudden sharp pain over the entire abdomen which after about 12 hours localized in the lower right quadrant. He treated himself with caroid and milk of magnesia, and as these had no effect, took an additional large dose of Epsom salts. Immediately he began to grow worse, the pain spread again over the abdomen, and he became nauseated and vomited several times. He took an enema which he stated was effectual and caused some relief, but he continued to stay in bed and noticed that his abdomen gradually seemed to swell. On entrance to the hospital he appeared acutely ill and surgical consultation was obtained. The temperature was 99°F., the pulse rate 86, and the respiratory rate 22. The past history revealed the following items of interest. At 19 he had had a severe attack of rheumatic fever lasting for several months. From that time on he had infrequent attacks of rheumatism and heart trouble. In 1932 he had had a second severe attack of rheumatism which kept him in bed for 8 months. A bilateral hernioplasty had been performed in 1922. At that time he was told that he had rheumatic heart disease. Since that time he had been constantly under treatment for rheumatic heart disease by Dr. Morhart. Examination of the patient by Drs. C. S. White and Thomas S. Lee showed a marked pulsation of the great vessels of the neck. The left border of the heart was found to be 16 cm. to the left of the midsternal line in the fifth interspace and 10 cm. to the left in the third interspace. The heart rate was 110 with presystolic gallop-rhythm. A few ventricular premature contractions were constant. The blood pressure was 160 systolic and 70 diastolic. Mitral and aortic systolic murmurs were present. No gross abnormalities of the lung fields were elicited. The abdomen was distended, and muscle spasm was fairly marked bilaterally below the umbilicus. The entire hypogastrium was tender; on the first day the greatest tenderness was apparently about McBurney's area, but on the following day the tenderness had shifted to the left side. No organs were palpable and there was no evidence of free fluid. There was no peripheral edema. On the following day, the Fowler-Murphy-Ochsner treatment for peritonitis was instituted and rigidly adhered to until October 13. Constant duodenal drainage was used. At this time the abdomen was much less painful, less distended and duodenal drainage was discarded. On October 14, a fairly large petechia was found present on the volar surface of the left wrist, and the diagnosis of mesenteric thrombosis was first suspected. On October 18, the patient experienced a sudden sharp pain in the precordial area, the systolic pressure dropped 40 mm., and the pain was only partially relieved by morphine. After 2 days of sedative treatment an area of consolidation in the right lung hilus was found by Dr. Lee and this condition was concluded to be pulmonary infarction. On October 20, a second attack occurred, and the following morning a fairly large area of consolidation was present over the left lung base. Uneventful absorption occurred until October 26, when the patient had a second attack of abdominal pain which developed suddenly as the patient sat up in bed. Tenderness immediately became generalized over the hypogastrium, with no localizing points. After about 8 hours the pain decreased, and the patient began passing large amounts of flatus by rectum and mouth. This continued for about 2 days, the patient gradually improving. He had lost approximately 40 pounds during the illness. After October 26, he rapidly improved, felt better, and began to regain his weight. The patient was discharged November 5 in good condition. He was seen later in December by the writer when he had regained all but 10 pounds of the lost weight and was feeling very well.

Hematologic studies revealed no chemical disturbance at any time. On admission a leukocytosis of 18,500 with 89 per cent neutrophiles was present which gradually resolved until December 18, when the count rose to 27,000 following the first pulmonary infarct. Electrocardiographic studies done in the presence of digitalis showed no marked abnormalities. No gross blood was ever seen in the stools. The preoperative diagnosis of mesenteric thrombosis was naturally based largely on speculation, but with the pulmonary infarcts and the resolution of both abdominal and intrathoracic processes, the marked similarity would seem to substantiate greatly the diagnosis of thrombosis of one of the smaller arcades of the superior mesenteric artery.

Mesenteric vascular occlusions have been considered quite unusual. Boyce reports 13 cases in over 300,000 admissions at the Charity Hospital, New Orleans. Fourteen cases only are found in the records of the Johns Hopkins Hospital from its founding until 1923. The Binghamton City Hospital records show 8 authentic cases with 1 recovery in the last 10 years. Various authors have placed the mortality from 57.6 to 95 per cent. The figures of frequency as Boyce states are exceedingly low because few of the minor cases with spontaneous recovery are diagnosed at all and many cases are not reported as such at autopsy. In only 9 of Boyce's 13 cases was the diagnosis even suspected before operation or autopsy, and these were all fatal except for 1 operative recovery.

Records of the Emergency Hospital from January, 1931, until November, 1935, show 30,201 hospital admissions with 7 cases of mesenteric vascular occlusion. Several additional autopsy reports suggested that the diagnosis should have been mesenteric vascular occlusion.

The 6 fatal cases are reported briefly:

Case 2: A. G., a 56-year old white woman (patient of Dr. John H. Lyons), was admitted to the hospital October 25, 1931, having been ill since October 19, 1931, with the chief complaint of severe abdominal pain. On admission the typical high leukocytosis of thrombosis was present, the white blood cell count being 35,500 with 88 per cent neutrophiles. Enemata were productive of fecal material without gross blood. The contents of abdominal lavage were the typical decomposed bile of intestinal obstruction. She was operated upon after 14 hours of observation with the diagnosis of dynamic ileus. A resection of the involved gut with anastomosis was performed, but too late, for the patient died 12 hours later. At operation about 5 feet of gangrenous gut was found.

Case 3: T. W. S., a white man, aged 64 years (patient of Dr. N. N. Smiler) was admitted on February 29, 1932, and died on March 24. At autopsy the diagnosis of coronary, cerebral and mesenteric thromboses was made. Due to the severity of the coronary and cerebral processes abdominal operation was at no time justified since the mesenteric thrombosis was merely a complicating terminal event.

Case 4: R. R. B., a white man, aged 67 years (patient of Drs. Worth B. Daniels and C. S. White), had been seen off and on for 3 months previous to hospitalization with the usual complaint of vague abdominal pain relieved by enemata. On December 5, 1933, he had a severe attack of lower abdominal pain not relieved by enemata or antispasmodics; after 6 hours he began to vomit and became severely ill. After admission to the hospital duodenal suction was used without improvement. Six hours from the onset he was operated upon by Dr. White. At operation about 3 feet of dark red bowel was seen with the adjacent mesentery thickened and darkened. The mesenteric vessels supplying this area were strangulated by a fibrous band which was resected. The vessels immediately regained their tone and it was deemed inadvisable to perform a resection. Following operation there was some improvement for a day or so, but the patient then began to get worse and died on the sixth postoperative day. Autopsy showed complete thrombosis of nearly all of the mesenteric vessels supplying the gangrenous intestine. This fibrous band undoubtedly caused a constriction resulting in thrombosis of the involved mesenteric vessels.

Case 5: F. H., a colored man, aged 58 years (patient of Dr. William B. Marbury), was admitted October 23, 1933, directly to the operating room with a diagnosis of strangulated inguinal hernia. At operation about 2 feet of intestine was found in the sac; at one place about 6 inches of intestine was somewhat cyanosed. The condition of the mesentery was not stated. The patient died during a blood transfusion the following day. Autopsy showed dilatation of the stomach and small intestine, with about 3 feet of the midportion of the small intestine deeply hemorrhagic as the result of thrombosis in a tributary vein of the mesentery. The thrombus and vein were both demonstrable.

Case 6: E. A. M., a 69-year old white woman (patient of Drs. James F. Mitchell and Worth B. Daniels), was admitted January 26, 1931. The previous month she had had a fracture of the left humerus and developed phlebitis in both lower extremities, which had cleared up under treatment. Ten days before hospitalization she had developed abdominal distention and was very uncomfortable off and on until January 25, when she had severe generalized abdominal pain and began to vomit. On January 26 the abdomen was distended, tympanitic and markedly tender. She was operated upon immediately. About 20 inches of gangrenous ileum was found, with a corresponding friable and partly gangrenous mesentery. Numerous small clots were found in the mesenteric vessels. Resection and anastomosis were performed. The patient died on the third postoperative day.

Case 7: W. F., a 41-year old white man (patient of Dr. M. W. Perry), first developed cardiac symptoms in 1917 at the age of 25, probably as a result of a severe case of scarlet fever when 10 years old. He was first diagnosed as a case of auricular fibrillation in 1919 and since that time had been studied at the George Washington University Hospital. He was first admitted to the Emergency Hospital, August 26, 1933, when the following diagnosis was made: Auricular fibrillation with cardiac decompensation resulting from chronic myocarditis; etiologic basis undetermined. At the time he was functionally Class 3. Quinidine was discontinued and the patient after full digitalization left the hospital improved. Two months later he returned, was treated for bronchial asthma and improved. On this occasion the heart lesion remained about the same, but any mild activity or decrease in digitalis would result in decompensation.

A readmission history in February, 1934, states that the patient was seen during an attack of psychosis and was transferred immediately to Gallinger Municipal Hospital. No further notes about psychic state are available. In June, 1934, he returned to our hospital with fibrillation, since digitalis had caused so much nausea and palpitation that he had been unable to take any for the preceding 10 days. He was thoroughly studied on this occasion, the diagnosis being confirmed by radiologic and cardiographic evidence, and after 91 days was discharged in a somewhat improved condition. In September, 1934, he returned for a 59-day stay and again regained compensation and was discharged in fairly good condition. Up to this time there is no record of embolic phenomena or abdominal pain.

On August 4, 1935, the patient returned again, sent in by Dr. F. S. Horvath, who had been treating him for congestive heart failure. He had had a thyroidectomy in March, 1935, at some other hospital. Examination revealed the previous findings, an enlarged heart with very irregular rhythm. The liver was slightly enlarged and tender, as was the spleen. Morphine, adrenalin and atropine were exhibited with maintenance dosages of digitalis and a slight amount of phenobarbital. On August 8, he vomited at about 9:00 A.M., and the pulse became slower. It was thought he was overdigitalized. The previous day he had mild diarrhea, which was checked with Dover's powder. About 1 hour after the first vomiting attack, abdominal pain came on suddenly and quickly; it became so severe that the patient commenced to roll about in bed. The blood pressure increased from 185 to 270 systolic and from 100 to 125 diastolic within an hour. There was tenderness in the epigastrium but no rigidity. Morphine, atropine and nitroglycerine gave some relief. At 2:15 P.M. the pain had again become severe and more morphine was given. At 3:30 P.M., Schlessinger's solution was tried unsuccessfully. At 6:15 P.M. more morphine gave relief. On surgical consultation at 7:00 P.M. the question of pancreatitis, renal calculus, ileus, gall stone colic and aneurism were considered. On August 11, 3 days after the abdominal pain began a preoperative diagnosis of possible mesenteric thrombosis had been made by Dr. Walter Atkinson. At operation all of the small bowel and about one half of the colon were discolored. The mesenteric artery did not pulsate. No resection was done.

Autopsy the following day showed the mitral valve to be narrowed and thickened. "On the aortic side, there was a raw area with some missing chorda tendineae, also part of the endocardium and valve." The abdomen contained some free sanguinous fluid. The small bowel appeared to be congested. There was a definite line of demarcation near the junction of the duodenum and jejunum. No thickening or thrombus of any of the arteries of the mesentery was seen, but upon opening the aorta a large thrombus was found to be blocking the opening of the superior mesenteric artery and was found to extend upward 1½ inches, completely filling the lumen. Atrophy of the right kidney suggested an old infarct.

Although our histories show no record, this man was seen on at least three different occasions during the last 3 years of his illness by various surgical consultants who were called after the patient had more or less severe attacks of abdominal pain. Each of these attacks had cleared up without operation. There is no record of previous vascular disease of the mesentery in the autopsy report, but it is suspected that careful search would have revealed such changes, since it is now apparent that these abdominal crises were smaller mesenteric infarcts.

Kussmaul and Gerhardt have laid down a series of postulates as regards the diagnosis of mesenteric thrombosis, and as our cases have shown a remarkable fulfilment they may well be repeated: (1) A source of an embolism; (2) melena, not to be accounted for by a primary intestinal lesion; (3) rapid and excessive fall of temperature; (4) severe colicky abdominal pain; (5) later distention of the abdomen with tympanites and shifting dulness; and (6) embolic phenomena elsewhere in the body. Larson noticed an almost uniform fulfilment of these postulates in the records of 36 autopsy protocols of mesenteric thrombosis from the Mayo Clinic.

In Meyer's series of cases vomiting was present in 55 per cent of cases and absent in 10 per cent. Nausea was present in only 20 per cent. Blood in the stool was reported in 14 per cent and absent in 8 per cent. Rigidity was present in 10 per cent, absent in 15 per cent. Distention at some time was noted in 45 per cent. The findings except for the high leukocyte count were essentially the same as those found in early bowel obstruction.

The condition when infarction appears is really one of intestinal obstruction with the varying signs of that condition. However, one does not expect a definite symptom complex when the condition is known to vary in involvement from a few inches of gut to the entire small and about half the large intestine. The symptoms in all our cases have been those of an abdominal catastrophe, indicating an exploratory operation. However, the writer while an intern in a mental hospital saw a case of bloody diarrhea which complicated a case of epidemic measles. Examination of the patient revealed a negro woman of about 40 years of age who had been an inmate of the hospital for the previous 25 years as a case of schizophrenia simplex. She had been a willing worker and had been very little disturbed for the preceding 3 months. The abdomen was soft, and the patient complained only of frequent bloody stools; about 4 stools an hour for the past 6 hours had been passed. There was no acute abdominal pain. Supportive treatment was without benefit. The patient died 36 hours from the beginning of the attack. Autopsy showed complete thrombosis of the ileocolic artery with gangrenous enteritis of about 6 feet of the terminal ileum. The aorta was quite atheromatous.

Douglas reported a case in which a plain roentgenogram demonstrated a contracted loop of intestine in the left lower quadrant, making not only a preoperative diagnosis possible, but allowing determination of the location of the operative incision and the extent of bowel involved. Such roentgenograms have been of remarkable aid in the diagnosis of ileus, and the procedure is indicated in all questionable cases.

The borderline between surgical intervention and nonoperative treatment according to most authors is apparently rather fine. From the morbid anatomy it is evident that unless there is insufficient circulation for life the condition will adjust itself. Meyer found 9 instances of spontaneous recovery in 92 cases. Abrams reported 1 case which was diagnosed as occlusion and operated upon. Not enough involvement was found to warrant surgical intervention. However, Warren in a statistical analysis showed conclusively that if the condition is diagnosed early and operation performed with resection of the involved bowel and its mesentery the prognosis is relatively good, but that it falls rapidly with every hour of delay, until after 24 hours of acute symptoms the outlook becomes extremely bad. Such a conclusion is borne out by our operative cases.

In 5 cases of recovery in Warren's series, the patient is described as being in "shock" or "in very bad condition," at the time of operation. These facts incline them to the belief that when dealing with a condition which is known to be almost uniformly fatal without operative interference, the only course is to give the patient whatever chance an operation may offer.

Considerable controversy raged at one time about the type of operation to be used, but the consensus of opinion today seems to be that so long as the infarcted bowel and mesentery is removed it makes little difference as to the type of operative procedure.

As to the viability of the suspected bowel, the color alone is insufficient to form an opinion from. If the mesentery is seen to bleed easily the chances are that the bowel supplied by this segment is viable. Cases are on record in which recovery occurred after extensive resection, and other cases have recovered when apparently extensive damage to the whole intestine was present and resection was not performed. The question of resection is naturally a question of judgment.

SUMMARY

A series of 7 cases of mesenteric thrombosis from the records of the Emergency Hospital with 1 recovery is reported. An effort has been made to show that the apparently high mortality is undoubtedly due to the fact that diagnosis is seldom made of this probably not infrequent condition except in the autopsy room, where only the worst cases are seen.

BIBLIOGRAPHY

Abrams, A. B.: Mesenteric Vascular Occlusion. J. M. Soc. New Jersey, 1933, **30**, 564.

Boyce, F. F., and McFetridge, E. M.: Mesenteric Vascular Occlusion. Internat. S. Digest, 1935, **20**, 67.

Boyd, W.: Surgical Pathology. Philadelphia, Saunders, 1925, p. 148.

Conner, L. A.: A Discussion of the Rôle of Arterial Thrombosis in the Visceral Diseases of Middle Life, Based upon Analogies Drawn from Coronary Thrombosis. Am. J. M. Sc., 1933, **185**, 13.

Donaldson, J. K., and Stout, B. F.: Mesenteric Thrombosis; Arterial and Venous Types as Separate Clinical Entities; Clinical and Experimental Study. Am. J. Surg., 1935, **29**, 208.

Douglas, J.: Mesenteric Vascular Occlusion. Ann. Surg., 1935, **102**, 636.

Kussmaul and Gerhardt: Quoted by Trotter.

Larson, L. M.: Mesenteric Vascular Occlusion. Surg., Gynec. & Obst., 1931, **53**, 54.

Loop, R. G.: Mesenteric Vascular Occlusion; with Report of 9 Cases in which Operation was Performed. J. A. M. A., 1921, **77**, 369.

Meyer, J. L.: Mesenteric Vascular Occlusion. Ann. Surg., 1931, **94**, 88.

Sneierson, H.: Mesenteric Vascular Occlusion. Ann. Surg., 1935, **102**, 171.

Trotter, L. B. C.: Embolism and Thromboses of the Mesenteric Vessels. London, Cambridge Univ. Press, 1913.

Virchow, R.: Ueber die akute Entzuendung der Arterien. Arch. f. path. Anat. u. Physiol., 1847, **1**, 272.

Warren, S., and Eberhard, T. P.: Mesenteric Venous Thrombosis. Surg., Gynec. & Obst., 1935, **61**, 102.

HISTIDINE TREATMENT OF PEPTIC ULCER

REPORT OF THREE CASES

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The histidine treatment of peptic ulcer had its inception in 1923, when Mann and Williamson devised a technic for deviating the duodenum and its varying secretions into the lower end of the ileum. Using this technic, Weiss and Aron found that ulcers were produced in dogs regularly 2 to 4 weeks after operation. They also noted that the more rapidly the ulcer ensued postoperatively, the more marked were the other symptoms. In addition anemia, diarrhea, and a strong acidification of the intestinal contents were noted in the experimental animals.

Exposure of these experimentally produced ulcers to normal duodenal contents resulted in their rather prompt healing. Weiss and Aron advanced the theory that the most important etiologic factor in the production of these experimental ulcers was amino-acid deficiency. Experimenting with various amino-acid preparations, they found that certain of these were effective in healing these experimentally produced ulcers, and concluded that a preparation of histidine was the most effective in this respect, and also that the amino-acids, tryptophan, histidine, lysine, and cystine prevented the formation of ulcer in dogs. These 4 amino-acids are indispensable and cannot be formed without the intervention of food. Therefore, their rôle in the formation of ulcer may be explained on the grounds of short circuit in dogs—no food (no amino-acid); no amino-acid = ulcer; supply amino-acid (histidine), ulcer heals.

The amino-acids are formed by the action of proteolytic ferments on the digestive albuminoids. Histidine is an amino-acid produced by protein digestion, and is supposedly essential for cell life. The actual mechanism of the action of this amino-acid in the healing of these ulcers is by no means clear. There may be some explanation in its essential rôle as a factor necessary to cell integrity and repair. It also may be a factor in causing a secretion rich in the protective and acid-combining mucin. The mention of mucin reminds us that little is known regarding the mechanism of the mucoid glands. In this connection it may be stated that another problem must be faced with regard to the complexity of mucin, especially of the mucin of the stomach, duodenum and intestines. The problems involved regard the relations between the amino-acids and groups of carbohydrates derived in hydrolysis from proteins (glycosamine).

Some significance attaches to these relations now, in recalling that physicians of an older school recommend sulphur in the treatment of gastroduodenal ulcers.

Weiss and Aron continued their investigations with the amino-acids and determined that cicatrization of experimental wounds of the gastric mucosa was not influenced by histidine or lysine, but that tryptophan hastened the cicatrization and also caused marked proliferation of the gastric mucosa.

Having sufficiently developed their theory experimentally, Weiss and Aron now subjected 5 ulcerous individuals to daily doses of tryptophan and histidine. All had a typical history of ulcer evolving for years with painful episodes. All presented distinct roentgenographic signs of ulcer. Two had the perforating type of ulcers of the lesser curvature, 1 duodenal ulcer, 1 pyloric ulcer after gastro-enterostomy with peptic ulcer and the fifth a relapse of a duodenal ulcer after gastro-enterostomy with a peptic ulcer. All were given a generous meat and vegetable diet during the treatment, and no adjuvants were used. The pains ceased between the fourth and sixth injections. After 20 injections, the clinical signs of ulcer had disappeared, roentgenographic evidence showed marked improvement, and in all cases the gastric secretion, hypersecretion and hyperchlorhydria returned to normal values.

Other observers, among them Eads, Volini and McLaughlin, and Rafsky, confirmed the work of Weiss and Aron, as do Lenormand and others. Devoto is not in accord with Weiss and Aron and Lenormand. He states that while it may be admitted that to a certain extent the muciparous cells do need amino-acids for secreting the mucus, it is difficult to understand how a deficit of amino-acids can occur, especially a deficit of tryptophan and histidine. The fact is that relatively few farmers, whose chief diet is corn, suffer from gastroduodenal ulcer (corn meal contains a very small amount of tryptophan and histidine), while in persons eating large amounts of wheat bread, the affection occurs more frequently, and persons suffering from gout rarely have gastroduodenal ulcer. Devoto further states that proteins either homologous or extraneous to the system, when administered intravenously or hypodermically, have a beneficial effect due to an improved vascularization around the ulcer and diminution of the gastric tonus and contractions.

Now, tryptophan and histidine belong to the components of protein and may act in the same manner. A comparative study of the value of different treatments convinced Devoto that the treatment with sodium benzoate is generally to be preferred.

The following 3 cases from the authors' private practice are added to the literature on the subject. The immediate clinical results were gratifying, both to patient and physician, although the permanency cannot be evaluated because sufficient time has not elapsed since cessation of treatment. The form of histidine used was histidine monohydrochloride (Larostidin, Roche).

Case 1: C. E., a white woman, aged 49 years, gave a history strongly suggestive of peptic ulcer for the past 10 years and was placed on a modified Sippy diet, which relieved the symptoms and resulted in a gain in weight of 7 pounds over a period of 5 weeks. Modifying the diet to suit the appetite caused a return of pain. Three months after the patient's first visit, she returned complaining bitterly of nausea, vomiting and heart burn. Roentgen study at this time revealed an obstructive ulcer of the pylorus, with approximately 50 per cent residue after 5 hours, which was considered by the roentgenologist to be in all probability malignant and possibly operable. Laparotomy revealed a markedly thickened circular band in the prepyloric area with an area suggesting imminent perforation. Grossly the lesion appeared benign and no attempt was made to resect. Gastrojejunostomy and cholecystectomy were done. The patient's recovery was uneventful, except for a mild attack of cystitis, which subsided under treatment.

During the first postoperative year gastric symptoms occurred only occasionally and these were mild. Immediately on the expiration of the year, pain and other symptoms recurred almost to the extent noted immediately prior to operation. Dietary restrictions resulted in no improvement. Hematemesis occurred. Physical examination revealed no pulmonary or cardiac pathology, which was confirmed by roentgen studies of the chest and examination of the sputum. Hemogram showed 70 per cent hemoglobin, 3,910,000 erythrocytes and 7,800 leukocytes, with 40 per cent lymphocytes, 60 per cent polymorphonuclears and 398,640 platelets.

When bleeding ceased, a course of histidine monohydrochloride was begun. This consisted in the daily injection intramuscularly for 24 days of 5 cc. of a 4 per cent solution. The patient's weight at the beginning of treatment was 132 pounds, and the blood pressure was 150 systolic and 95 diastolic. Complete relief of pain and all symptoms followed the third dose. Mild symptoms returned after a few days, but the patient's distress was in no way acute. Following the eighth dose, definite arthritis of the proximal interphalangeal joint of the left fifth digit occurred; later the left elbow joint became involved, but both joints subsided after a mild course of about 2 weeks' duration. Following the thirteenth injection, pain was completely relieved and has not returned, although occasional slight nausea is the only complaint 6 months after completion of the course of treatment. The weight is now 135 pounds, a slight gain, and the blood pressure is 135 systolic and 90 diastolic, a slight reduction. The patient returned to her usual mixed diet after the tenth treatment.

Case 2: D. E. M., a white man, aged 38 years, was first seen on August 30, 1935, with a history of epigastric pain, relieved by soda and the frequent ingestion of small amounts of milk and cream. The pain was acute and was accompanied by nausea and distention. Physical examination revealed marked tenderness in the epigastrium, with some rigidity. No masses were palpable. A modified Sippy regime was instituted and the symptoms abated to some extent, although severe pain shortly recurred. Roentgen studies of the gastro-intestinal tract revealed duodenal ulcer. The clinical diagnosis of peptic ulcer confirmed by roentgen studies resulted in a decision to use histidine therapy. Twenty-four intramuscular injections of 5 cc. of 4 per cent histidine were given on consecutive days. The patient's weight at the beginning of treatment was 140 pounds, and the blood pressure 130 systolic and 85 diastolic. The usual weight was 155 pounds. After the second injection, pain, nausea, distention and other symptoms had disappeared. At the end of the tenth day all dietary restrictions were removed, and the patient returned to a mixed meat and vegetable diet. At the end of the course of treatment, the patient's weight was 146 pounds. Roentgen studies showed marked improvement in the duodenal deformity, and symptoms have not recurred after 3 months.

Case 3: H. R., a white man, aged 40 years, gave a history of epigastric pain more or less constant for 2 months, dull and aching in character, and most marked at night, when the knee-chest position had to be assumed for relief. The past history showed gastric symptoms over a period of 15 years. A strict dietary regime gave some relief. The most prominent symptoms had been pain, nausea, gaseous distention and occasional vomiting with acid eructations. Roentgen studies in 1931 and 1933 revealed duodenal ulcer. Following these studies courses of medical and dietary treatment were instituted with little if any relief, and operation was advised but refused. In view of the history a course of histidine treatment was immediately instituted. The patient's weight at this time was 170 pounds, and the blood pressure 140 systolic and 105 diastolic.

After the first injection pain and associated symptoms ceased. The course of 24 injections was completed without incident, except slight flatulence of which the patient complained for 1 day and which did not recur. Full and unrestricted diet was allowed after the tenth day. The patient's weight at the end of treatment was 176½ pounds, and there had been no recurrence of symptoms 2 months after completion of treatment. The blood pressure fell to 100 systolic and 70 diastolic at the end of the first week of treatment, and at the conclusion was about the same. Roentgen studies showed no evidence of organic disease, except slight deformity of the duodenal cap.

SUMMARY

1. Some of the literature is reviewed, and the results of treatment with histidine in 3 cases of peptic ulcer are reported.

2. All 3 cases showed marked improvement clinically, manifested by the absence of pain, nausea, vomiting, distention and acid eructations.

3. All cases gained weight and returned to their usual mixed meat and vegetable diet. The average gain in weight was 5 pounds.

4. The systolic blood pressure was markedly lowered in 1 case, slightly lowered in 1, and remained unchanged within normal limits in the third case, while the diastolic pressure was unchanged in 2 cases and lowered in 1.

5. No local reactions were noted at the site of injection in any case, but 1 patient developed a mild arthritis which promptly subsided. Whether this arthritis was the result of treatment or a coincidence cannot be stated.

6. All 3 patients were ambulatory and followed their usual occupations during and after treatment.

BIBLIOGRAPHY

Devoto, L.: Sulla terapia parenterale dell'ulcera gastroduodenale. Di alcune maniere di trattamento chimico. Gazz. d. osp., 1934, **55**, 141.

Eads, J. T.: Histidine in the Treatment of Peptic Ulcer; A Preliminary Report. Am. J. Digest Dis. & Nutrition, 1935, **2**, 426.

Lenormand, J.: Acidothérapie aminée et épigastralgies de cause non ulcéreuse (action de l'histidine). Gaz. d. hôp., 1934, **107**, 255.

Mann, F. C., and Williamson, C. S.: The Experimental Production of Peptic Ulcer. Ann. Surg., 1923, **77**, 409.

Rafsky, H. A.: Injection Treatment of Peptic Ulcer, with Especial Reference to the Use of Histidine Monohydrochloride. M. Rec., 1935, **142**, 289.

Volini, I. F., and McLaughlin, R. F.: Histidine Monohydrochloride Therapy of Gastroduodenal Ulcer; Preliminary Report. M. Rec., 1935, **141**, 364.

Weiss, A. G., and Aron, E.: Rôle des acides aminés dans l'évolution de l'ulcère expérimental; influence de l'histidine. Presse méd., 1933, **41**, 1880.

Weiss, A. G., Aron, E., and Holtzmann, P.: Influence des injections d'acides aminés (tryptophane, histidine, lysine) sur la cicatrisation de plaies artificielles de la muqueuse gastrique. Compt. rend. Soc. de biol., 1933, **113**, 1,067.

Weiss, A. G., and Aron, E.: Effets de l'injection d'acides aminés (tryptophane et histidine) sur l'évolution des ulcères expérimentaux obtenus par dérivation des sucs duodénaux dans l'ileon terminal. Compt. rend. Soc. de biol., 1933, **112**, 1,528.

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(*Continued from April, 1936*)

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Intoxications

The toxic agents affecting the central and peripheral nervous systems are of two types: the endogenous ones produced within the body proper, and the exogenous ones produced without the organism. In most of the acute infectious diseases there are noted, at one time or another, symptoms or signs that definitely indicate some toxic effect upon the nervous system. The symptoms are usually generalized, rarely focal, and consist of headache, vertigo, photophobia, vomiting, various degrees of stupor, and often evidence of meningeal irritation. An excellent illustration of this type of disturbance is that frequently seen in the course of lobar pneumonia, in which the patients are quite apt to show all degrees of disturbance of consciousness from acute maniacal reactions to severe coma. It need only be said in this regard that the one point of paramount importance is the distinction of these secondary general toxic reactions from actual disturbances originating within the nervous system itself. This is especially true when evidence of meningeal irritation is present and can sometimes be accomplished only by lumbar puncture and examination of the spinal fluid.

Of the endogenous toxins giving rise to more specific signs and symptoms, the two most important and widespread are those of tetanus and diphtheria. In the case of tetanus the period of incubation is extremely variable and may be only a few days or, on the other hand, may be a number of weeks. Most cases probably develop within 10 days of the original infection, which is usually that of small, penetrating wounds or of burns. Pathological changes are minimal, but the physiological disturbances are widespread and result in symptoms of marked spasm of the voluntary muscles. The usual onset is with headache, followed soon after by stiffness of the neck, and especially by stiffness and spasm of the muscles of mastication. This results in the typical picture of trismus or lockjaw. Following this, the muscle spasm and rigidity usually become generalized and may often result in marked opisthotonos. Death is usually from heart failure or from asphyxia due to involvement of the respiratory musculature. The muscular rigidity may be somewhat intermittent and may present the picture of marked convulsive phenomena followed by periods of comparative relaxation. The convulsions may sometimes be initiated by painful stimuli or by sudden, loud noises. Neurological examination reveals little, other than a generalized spasticity and increase in the deep reflexes. A variable degree of fever and leukocytosis is usually present. The pulse is rapid, usually becoming more so as the condition progresses. The prognosis is extremely grave, especially after the onset of severe spastic signs. There is some evidence to show that the gravity of the condition increases in inverse ratio to the length of the period of incubation. The treatment is predominantly prophylactic and consists in the subcutaneous injection of from 250 to 500 units of tetanus antitoxin, which should be administered immediately following any wounds, especially small penetrated wounds, that are apt to be infected. This applies particularly to powder burns and to wounds that may have been contaminated by the excreta of horses, whose feces are especially apt to contain the spores of the tetanus bacilli. Treatment following the onset of muscular rigidity is much less satisfying but should be vigorously instituted as soon as symptoms appear. The original wound should be cleaned out surgically and antitetanic serum should be given in the immediate vicinity of the wound. Large quantities of the serum, varying from 2,000 to 5,000 units daily, should be given intraspinally, intramuscularly, intravenously and subcutaneously. Severe spastic reaction must be combated by anesthesia. This should consist of intravenous sedatives, such as sodium amytal, or by the rectal instillation of bromides or paraldehyde in sufficient amounts to cause muscular relaxation. The use of avertin is also frequently indicated. Tube feeding may have to be resorted to as well as cardiac and respiratory stimulants. Occasionally one sees a chronic and less severe form of tetanus that appears after a considerably longer period of incubation. The indications for treatment are identical with those of the more severe forms, although the treatment in most cases need not be so intensive.

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* This is the eighth instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates. Other instalments will follow until completion.

The second of the common endogenous toxic conditions results from diphtheria. Since, however, the principal involvement is that of cranial and peripheral nerves, the condition will be taken up under the section dealing with the diseases of these structures.

Exogenous Toxins

Toxins that originate from without the organism itself and that produce severe, or at least appreciable effects on the central nervous system are numerous. In general, however, only a few of these account for the great majority of cases of intoxication. These are principally alcohol, the sedative drugs, the heavy metals and carbon monoxide and dioxide. A number of other agents may cause symptoms of intoxication, but these are rarely met with in common practice.

ALCOHOL

Alcohol is unquestionably the most important of the exogenous toxins. Its use is widespread, and its effects are variable. One must distinguish between the effects of acute and of chronic alcoholism. In the first place, by alcoholism is meant the condition that results from the ingestion of ethyl alcohol. The effects of other alcohols will be mentioned briefly later. Pathologically the picture in acute alcoholism is principally that of edema and of hyperemia of the central nervous system, especially the brain. In chronic alcoholism one sees very variable degrees of cellular degeneration, combined with demyelinization and a certain degree of atrophy of the convolutions, increase in the subarachnoid fluid, and thickening of the membranes. The disturbances in function resulting from alcoholism are extremely interesting. There appears to be, very definitely, a certain predilection for the cerebellar system and for those centers that govern the higher intellectual functions. During the earlier stages of alcoholism, especially in its acute form, there is marked lowering of the intellectual functions and release of the emotional centers. There is as well definite loss or reduction of judgment and of the ethical centers. The combination of these symptoms may result in true, although temporary, insanity. The cerebellar and upper brain stem structures are also commonly involved, as witness the frequent symptoms of ataxia, nystagmus and diplopia. Actual convulsive seizures may also be noted in the alcoholic, although not strictly speaking, epileptic individual. Markedly psychotic symptoms are also frequently noted in the alcoholic of long standing. These may take the form of a gradually dementing process, such as is noted in certain forms of general paresis, or may show up as acute hallucinatory episodes, such as is frequently seen in the widely recognized condition of delirium tremens. Certain secondary systemic complications, such as nephritis and disturbances in the gastro-intestinal sphere, are common accompaniments.

The picture of acute alcoholism is an easily recognizable one. The odor of alcohol is usually on the breath, the pupils are widely dilated although generally reacting to light, the gait is reeling and ataxic, and cerebration is obviously interfered with. Depending upon the degree of intoxication, there may be variable disturbances of consciousness and varying degrees of excitement. One of the most serious of the symptoms is the increase in reflex time, which undoubtedly accounts for a number of accidents in which alcoholic persons may be involved. Transient extra-ocular paralyses are also quite common and result in diplopia. For some time alcohol in varying concentration may be found in the blood and in the urine as well as in the spinal fluid. The pressure of the spinal fluid is almost constantly, although moderately increased. Tolerance to alcohol varies enormously. Certain individuals exhibit a reaction to exceedingly small quantities of alcohol that is strikingly similar to the picture seen in anaphylactic shock. Other individuals may consume large quantities and show none of the acute symptoms.

Chronic alcoholism almost invariably results in a combination of physical and mental deterioration, the latter usually overshadowing the former. As previously stated, the mental picture is often that of gradual progressive deterioration in all spheres. Tremors appear about the mouth and tongue and in the extended fingers. A mild, chronic form of ataxia is also present. Most important of all, chronic alcoholism often results in severe dietary disturbances, which may themselves produce very marked effects upon the nervous system. Under such circumstances, conditions resembling pellagra and peripheral neuritis are quite common. As regards the clinical course and prognosis, this varies a great deal with the degree and type of alcoholism.

The outlook in acute alcoholism is generally good. Rarely, however, one sees fatal results depending upon a severe and acute cerebral edema with involvement of the respiratory centers. As a result of exposure during an acute alcoholic episode, pneumonia with a fatal ending may set in. From the prognostic point of view, chronic alcoholism is an extremely disappointing condition, and one very resistant to treatment. This pessimistic attitude is based upon the well recognized fact that chronic alcoholism is in itself usually a symptom of underlying mental disturbance, rather than a disease in its own right.

The treatment of acute alcoholism consists in several factors: In the first place, alcohol itself must be rigorously interdicted. Mild sedatives may be employed as indicated and among the best of these is paraldehyde, which seems to have an almost specific effect upon acute alcoholic states. Finally, in the presence of coma, marked respiratory involvement, or other signs indicative of edema of the brain, one should always attempt to reduce this edema. This may be done by removal of spinal fluid by lumbar puncture, or by the intravenous injection of hypertonic solutions such as glucose. The gastric disturbances may be treated symptomatically and are usually self-limited. Treatment of chronic alcoholism is entirely by abstinence and by psychotherapy.

Propyl, amyl and butyl alcohols are sometimes found in bootleg liquor. Butyl alcohol is also found in paint. All of these alcohols produce severe mental symptoms, which are usually temporary but which may exceptionally be permanent or leave serious sequelae. The effects of methyl alcohol upon the psyche are basically similar to those of ethyl alcohol, but in addition more severe organic disturbances usually result. By far the worst of these organic disturbances is the blindness that occasionally follows the ingestion of methyl alcohol. From the pathological picture it is evident that this blindness depends upon degeneration of the cells of the retina and of the nerve ends of the optic tract. In early cases the ophthalmoscope reveals no objective disturbance, but the visual fields always show a large central scotoma. It has been supposed that these lesions of the visual apparatus are due to the action of formic acid, which is formed by the action of the hydrochloric acid of the stomach upon methyl alcohol. It may be for this reason that chronic alcoholics with their low gastric acidity or even complete achlorhydria rarely show visual disturbances, while the occasional drinker, with normal gastric acidity, shows marked changes following the ingestion of methyl alcohol. The course and prognosis in methyl alcohol poisoning is variable and depends upon the amount of the alcohol ingested and the severity of the reaction upon the optic nerves and cerebral structures. Very occasionally death may result during the acute stage. Even following recovery from a complete transient blindness, there is practically always a residual of some visual defect, especially in the nature of various scotomata. Treatment consists in removal of the drug and ingestion and injection of sodium bicarbonate. This should be given by all routes including the spinal.

SEDATIVE AND HYPNOTIC DRUGS

Until comparatively recent years, the sedative and hypnotic drugs that might produce deleterious effects upon the central nervous system were few in number, and, moreover, most of them could be obtained only upon prescription. More recently a number of sedative drugs, most of them with proprietary designations, have flooded the market. Most of these can be purchased openly and without prescription, and it is also unfortunately true that the composition of most of them is unknown to the majority of physicians who prescribe them. As a result of this uncontrolled system of dispensation, the increase in toxic conditions resulting from overdosage has been almost unbelievable. As a result, too, of closer supervision of the true hypnotic drugs, such as morphine, cocaine and heroin, actual cases of true addiction to the milder sedatives is becoming more and more frequent. Many cases of overdose are probably the result of accident, but the majority are the result of suicidal attempt. It must also be admitted that a certain number of cases occur as a result of injudicious drug therapy, especially in the course of chronic diseases.

Morphine and its derivatives, when used in small doses, usually result in a feeling of well-being, a heightened resistance to painful stimuli, and often an increase in ability to perform work. The only physical evidence is in the nature of contracted pupils. Addiction, however, is common, and the drug then becomes a necessity and must be used in ever-increasing dosage to produce an effect. Accompanying the increase in the morphine dosage is constipation, loss of weight, and loss of sexual potency. The prognosis, in cases of morphine addiction, is extremely serious, since most of the addicts have a background of psychopathic personality of some sort or other. Treatment is by withdrawal of the drug, either gradually or suddenly, the former method probably being the best. It is usually necessary to employ sedatives during this period of time, on account of the rather severe withdrawal symptoms that may appear. Probably the best drug for this purpose is scopolamine. The treatment in cases of acute morphine intoxication consists in the administration of stimulants, such as caffeine and strychnine, combined with vigorous attempts to keep the patient in constant motion so as to prevent or combat stupor.

The bromides have an extremely important place in therapy, but cases of addiction and overdosage are quite common. Actual visible changes within the nervous system are slight and nonspecific. The most important finding in the case of bromide intoxication is the marked increase in the bromide content of the blood and of the spinal fluid. Following the ingestion of large quantities of bromide, the presenting symptom is that of profound coma. In the more chronic cases one finds the fairly typical skin eruption, lethargy, tremor and ataxia, mental confusion, and sometimes even stupor. In both types the bromide is present in the blood and spinal fluid. The principal vicious effect of bromide intoxication is produced by its disturbance of the normal metabolism of chlorides in the body. Death usually results if 33 per cent of the sodium chloride of the blood is replaced by sodium bromide. In such cases hydrobromic acid, instead of hydrochloric acid, is secreted by the stomach, is neutralized, and is reabsorbed in the intestines as sodium bromide. It is important to bear these factors in mind in view of their relation to reasonable treatment.

Death in acute bromide intoxication results from inhibition of the bulbar centers and is always preceded by a variable period of deep coma. Until recently treatment at this stage consisted in the injection of large quantities of salt to hasten the excretion of bromides. Very recently it has been found that the intravenous injection of picrotoxin, which is a cerebral convulsant, has a startling effect in such cases of coma. The treatment and dosage has not yet been standardized completely, but it has been frequently noted that in a few seconds following the injection of the picrotoxin complete return of consciousness occurs which is usually permanent. The further treatment of both acute and chronic bromide intoxication should consist in constant drainage of the stomach contents to remove the hydrobromic acid that is secreted, and the injection and ingestion of large quantities of sodium chloride. The eventual outlook in all cases of bromidism is, generally speaking, good if the bromide factor can be discovered early and treatment instituted at once.

The barbiturates as a group are widely used in medicine as sedatives and as anticonvulsants. Toxic symptoms from these drugs are usually the result of suicidal attempts. The pathological changes in these cases are small perivascular "ring" hemorrhages, diffuse fatty changes in the smaller blood vessels, and diffuse degenerative changes in the larger nerve cells. Clinically, acute intoxication is characterized by delirium and a variable degree of maniacal reaction. Eventually coma supervenes, and death frequently follows. On recovery from the coma there is usually mental confusion, speech difficulty, and frequently nystagmus. Occasionally skin eruptions appear after the lapse of a period of time. The clinical picture of chronic intoxication from the use of a barbiturate is that of tremors, ataxia, mental dulness and speech disturbances. The prognosis in severe acute cases is generally poor, while in chronic cases it is generally a great deal better. Treatment in the acute cases should consist in the injection of stimulants, such as strychnine, over a period of hours or even of days if necessary. This should be combined with lumbar puncture and general supportive measures, including the injection of large quantities of fluid. Picrotoxin is also efficacious. Artificial respiration of oxygen and carbon dioxide have been highly recommended.

Of the heavy metals, a great many are commonly met with in manufacturing procedures and in commerical use. A number of these have a definite and marked effect on the nervous system. A number of them also are employed therapeutically and may at times give rise to toxic symptoms.

Lead plays an important part in this group of metals. It is used in a number of industries and in a number of commercial products. Painters using lead paints often show the results of lead intoxication. With the introduction of gasoline containing lead a number of new cases were reported before adequate precautions could be taken. Lead water-pipes are also a potential source of lead intoxication. Lead poisoning in children, especially infants, frequently occurs as a result of licking or biting lead toys or lead paint from cribs or other articles of furniture. Cases have also been reported in which face powder and snuff containing lead have been implicated. It is generally supposed that the lead is absorbed through the gastro-intestinal tract and is carried to various organs where it is stored. The principal storing of lead occurs in the bones. If the storage is prompt and if it occurs principally in the bones, symptoms of lead poisoning may be almost completely absent until, as a result of some intercurrent process such as infection, deleading occurs and the organism is again flooded with lead. Excretion is generally by way of the kidneys. Lead frequently produces gastro-intestinal symptoms, anemia and peripheral neuritis, as well as definite disturbances in the central nervous system. Changes within the central nervous system consist of degeneration of ganglion cells, proliferation of the vascular adventitia, small scattered areas of softening, generalized cerebral atrophy and meningeal adhesions. Lead may also be actually demonstrated within the brain tissue. Clinically, the cerebral symptoms of lead poisoning, or lead encephalopathy as it is called, are variable. Convulsions are extremely common, especially in children, and many forms of disturbances of consciousness, such as coma, stupor, or excitement, may also occur. All sorts of paralyses of cranial and peripheral nerves as well as hemiplegias may be found. Headache and vomiting are frequent complaints, and with increase in intracranial pressure, which is quite common, there appear varying grades of choking of the optic discs. Tremor, twitching, and spasm of Jacksonian type are quite frequent. Contractures may follow in chronic cases. In most cases certain combinations of symptoms appear and certain objective signs may be found. Along with the symptoms of cerebral involvement that have just been mentioned, there are very commonly colic and other gastro-intestinal disturbances, a lead line on the gum or just inside the anus, basophilic stippling of the red cells and, especially in children, a lead line visible at the epiphyses of the bones, especially the long bones. When peripheral neuritis appears it usually affects the radial nerve, resulting in wrist drop. This particular sign is always extremely suggestive of lead paralysis.

The course and prognosis in lead intoxication is extremely difficult to predict accurately. Children are usually severely affected and may die, or they may show serious residual sequelae, such as feeblemindedness or other mental disturbances. In general, in adults the outlook is somewhat better and depends to a considerable extent upon reasonable treatment. At one time the treatment of lead disturbances consisted in an effort to remove the lead from the body very rapidly. This resulted, however, in an increase in the signs and symptoms, and was consequently discarded, or at least modified. The best method of treatment is probably that which consists in the administration of calcium, viosterol, cod liver oil, and exposure to sunlight in an effort to promote the deposition of the lead in the bones. It must be remembered, however, that infectious diseases and acidosis are quite apt to liberate the lead and again turn it loose in the circulation. In view of this fact, deleading may be attempted. This should be done extremely carefully and under adequate supervision. It is usually accomplished by the use of parathyroid hormone and ammonium chloride in small doses.

Arsenic intoxication occurs generally as a result of suicidal intent or as a result of arsphenamine medication. Its principal effects on the nervous system are on the peripheral nerves. When lesions occur within the central nervous system they are in the nature of multiple hemorrhagic infarcts. The clinical picture of this form of arsenic poisoning, the so-called arsenical encephalitis or arsphenamine encephalitis, has been described previously.

The effects of mercury and bismuth upon the nervous system seem to be secondary to their effects upon the kidneys. These changes are in the nature of generalized edema and acute ganglion-cell disturbance. Occasionally small hemorrhages are also present. The clinical picture is that of diffuse involvement of the brain, with headache, vertigo, increase in intracranial pressure and often some evidence of focal disturbances.

Thallium is a drug that has only recently come to the attention of clinicians through its effect upon the central nervous system. It has been used extensively in depilatories and seems to have an almost specific effect upon the optic nerve. There appears a retrobulbar neuritis with paracentral scotomata and reduction in the visual acuity. With continued use of the drug actual optic atrophy may appear.

Manganese poisoning affects principally workers in certain industries in which this metal is used. Its primary effect seems to be upon the blood vessels of the brain, in which it produces thickening of the connective tissue and sometimes complete occlusion of the lumen. These changes are especially marked in the corpus striatum and result in a picture that is extremely similar to that of parkinsonism, with its combined tremor and rigidity.

CARBON MONOXIDE AND DIOXIDE

Carbon monoxide poisoning usually results from exposure to coal gas, illuminating gas, and the fumes from automobile exhausts in enclosed spaces. It is an extremely dangerous gas because it is odorless and tasteless, and a very small concentration of the gas in the atmosphere is sufficient to produce very serious symptoms and even death. The pathological picture consists of miliary hemorrhages, thromboses and softenings that are especially common in the globus pallidus of the corpus striatum. Clinically, the first symptoms are headache, nausea, vomiting and visual disturbances. These are followed by stupor, complete unconsciousness or coma, very frequently convulsions, and dilatation of the pupils. The gas itself combines with the hemoglobin of the blood to form carbon monoxide hemoglobin, which gives a cherry pink color to the skin as well as to the blood. Recovery from small doses is usual and prompt. Even following large doses of the gas and unconsciousness for several hours, recovery may be complete and spontaneous. Exposure to small concentrations of the gas over a long period of time very often results in various degrees of mental enfeeblement and deterioration. Treatment of carbon monoxide poisoning, especially in acute cases, is by means of oxygen inhalation and blood transfusions.

Carbon dioxide intoxication is always the result of asphyxiation, which may be due to a variety of causes. Both the pathological and the clinical pictures are strikingly similar to that of carbon monoxide poisoning. Treatment consists in the administration of oxygen.

(*To be continued*)

ABSTRACT OF PAPER[*]

"HEMICRANIA COMPLETELY RELIEVED BY LOW PROTEIN, LOW SALT, HIGH CARBOHYDRATE AND HIGH FAT DIET: REPORT OF A CASE," **Henry A. Monat, M.D.**

Reviewing the medical literature on the subject of migraine, one finds such a multitude of dietary, pharmacopeic, physiotherapeutic, endocrinologic and psychotherapeutic remedies, all with promising results, that one is apt to ask himself, "Quo vadis Medicina?" The tortures of migraine are not at all exaggerated to warrant such multitude of therapeutic effort. An amusing reference to the excruciating pain in hemicrania is found in the instance of Zeus' splitting headache which was relieved by the ax of the son of Titan and subsequent birth of Minerva.

Barborka and Menninger have reported excellent results with a ketogenic diet. Unfortunately, such was not my experience, for among others the case presented did not respond to this diet. The patient, F. S., was readmitted in March, 1934, to the United States Veterans' Hospital, Dayton, Ohio. On previous admissions he had had a complete and thorough diagnostic study including allergic skin tests. With the exception of simple tachycardia and substandard weight, the findings were essentially negative. He was, therefore, classified as having idiopathic migraine. He was placed on a ketogenic diet without result. The attacks of headache, of 12 years' duration, continued to occur from 4 to 6 days apart and lasted from 12 to 24 hours. He described the pain as a feeling of some one pulling the eyeball out. Patient was very intelligent and coöperative. He was placed next on a low protein, low salt, high fat and high carbohydrate diet. A week after he had been placed on this regimen, he noticed an easing-up of his headaches, and 4 weeks later they entirely disappeared. The recovery was quite spectacular. During this period the patient broke his diet once by eating chicken, and the hemicrania recurred that day. He gained 10 pounds during the hospitalization and was discharged apparently free from the complaints of migraine.

In a follow-up inquiry 15 months later he was still free from hemicrania by carefully watching his diet.

The Basic Science Law in Nebraska, After Eight Years. The first enactment of basic science laws in the United States occurred in 1925. During that year 2 states adopted laws of this type. These 2 states were Wisconsin and Connecticut. In 1927, 3 more states adopted similar laws. They were Washington, Minnesota and Nebraska. Since then 5 more states have entered the field, namely, the District of Columbia and Arkansas in 1929, Arizona in 1933, Oregon in 1934 and Iowa in 1935. Thus there are now 10 states operating under basic science laws. . . .

. . . After the advent of the Basic Science Law there were no failures in medicine. This is easily explained. A grade of 75 is required in the basic sciences. A grade of 60 is required in medicine. An applicant who could pass the examinations in the basic science subjects with a grade of 75 would have little difficulty in passing all the subjects required in medicine with a grade of 60. Of course a number of applicants in medicine failed when they came before the Basic Science Board. . . . A number of osteopaths succeeded in passing the examination of the Basic Science Board and consequently were granted a license. Like the applicant in medicine, an applicant in osteopathy who had passed the examination of the Basic Science Board would have no difficulty in passing that of the Board in Osteopathy. The fact that 2 or 3 applicants in osteopathy succeed annually in passing the examination of the Basic Science Board speaks well for that school. It also illustrates the point that the object of the Basic Science Law is not to reject applicants from any particular school but rather to protect the public from the unqualified applicants of all schools. . . . No applicants from the chiropractic school appeared before the Chiropractic Board after the Basic Science Law became effective.

Conclusions. 1. The medical profession in Nebraska has reacted favorably toward the accomplishments of the Basic Science Law. They believe that the law has rendered a real service to the public. 2. The public also has accepted the law and its results, with practically no criticism. 3. Those states operating under a multiplicity of boards are justified in considering the enactment of a law of this character.

Extra from article by H. J. Lehnhoff, M.D., Lincoln, Nebraska, *Federation Bulletin, May, 1936, p. 144.*

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[*] Read before the Section on Internal Medicine, March 27, 1936.

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ETHICAL STANDARDS

With all the writings containing implications regarding the physician and his relationship to the public's economic status that have filled pages of national, state and local medical publications, as well as pages in such lay publications as the Atlantic Monthly and of more lowly periodicals in the literary scale, we feel that basically the profession has remained loyal to the ideals that have actuated true followers of Aesculapius down through the centuries. The healing of the sick and the prevention of disease, although bound in with sociological problems as they are and problems that have been most acute, must ever remain, as to direction and of necessity as to performance, in the hands of accepted practitioners of medicine. There have been many open and many subtle attempts to gain leadership and direction of the entire medical profession by sociologists, propagandists of all sorts, and by planners of economic structures. A thinking member of the profession must frequently pause to reflect or suddenly he will find himself caught in a drift that moves swiftly in a direction pre-designed by clever visionaires and sponsors of socialized trends. The end may be a maelstrom from which escape is impossible. In retrospect we believe the American Medical Association has exercised due forethought when beset by alleged discoveries of this or of that panacea for all the ills extant, which the profession and the public have suffered or to which they will ever be exposed, when it has largely maintained the rôle of a fact-finding commission, with facts freely accessible to all. The amount of material collected is voluminous. Recommendations have been forthcoming only after mature judgment. The A. M. A. has proven to be a vast bulwark protecting its members and the public, through its assembly of data and painstaking search for truth; above all, despite many tempting opportunities the medical practitioner has had for monetary gain through various lay agencies, the national medical body has been the great stabilizing force for maintenance of ethical standards. The physican primarly eagerly seeks scientific betterment so that he can more readily alleviate suffering. The profession as a whole does not shirk its duty toward the indigent in dispensary or private practice, neither does it greatly need the advice of laymen who have pursued the social sciences in college and are now dispensers of Government largess. However, social planners frequently need the profession, to put over their ideas and to gain professional aid for projects, many of which are meritorious, some questionable. The profession has from time immemorial held an estimable and dignified position in the community. We believe it still free from selfish motivation and well worthy of its heritage. The breadth of scientific knowledge has stimulated specialism; the intimate contacts between the family and the doctor have become less apparent, especially in the larger communities. Standards for ethics in any profession cannot be expected to arise spontaneously in the hearts of its individual members. The code of ethics issued by the American Medical Association is a valued compilation. If one follows these precepts he will be less likely to respond to lay propagandists and undoubtedly will cause more harmonious relationships in the profession. Many still in practice subscribed to the Hippocratic Oath as a contingency for obtaining their diploma. Many have been graduated without ever once reading its ideal inculcating words. From far off antiquity comes these directive phrases for conduct which have lost none of their force and power for good. The Hippocratic Oath*:

I swear by Apollo the physician, by Aesculapius, Hygeia, and Panacea, and I take to witness all the gods, all the goddesses, to keep according to my ability and my judgment the following Oath:

To consider dear to me as my parents him who taught me this art; to live in common with him and if necessary to share my goods with him; to look upon his children as my own brothers, to teach them this art if they so desire without fee or written promise; to impart to my sons and the sons of the master who taught me and the disciples who have enrolled themselves and have agreed to the rules of the profession, but to these alone, the precepts and the instruction. I will prescribe regimen for the good of my patients according to my ability and my judgment and never do harm to anyone. To please no one will I prescribe a deadly drug, nor give advice which may cause his death. Nor will I give a woman a pessary to procure abortion. But I will preserve the purity of my life and my art. I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners (specialists in this art). In every house where I come I will enter only for the good of my patients, keeping myself far from all intentional ill-doing and all seduction, and especially from the pleasures of love with women or with men, be they free or slaves. All that may come to my knowledge in the exercise of my profession or outside of my profession or in daily commerce with men, which ought not to be spread abroad, I will keep secret and will never reveal. If I keep this oath faithfully, may I enjoy my life and practice my art, respected by all men and in all times; but if I swerve from it or violate it, may the reverse be my lot.

GROUP HOSPITALIZATION, INC.†

The annual meeting of Group Hospitalization, Inc., was held on March 27, 1936, in the United States Chamber of Commerce Building at 8 P.M. The Medical Society of the District of Columbia's committee was represented by some 12 to 15 members.

Group Hospitalization, Inc., enjoyed a most successful year in 1935. Starting operations on July 1, 1934, with 26 groups participating and an enrolment of 644 members, the enrolment had increased to 4,053 by January, 1935. This increase in membership was steadily maintained and on December 31, 1935, 311 groups were participating with a membership of 17,468. By the end of April, 1936, this enrolment is anticipated to exceed 20,000.

The Treasurer's Report showed an excellent financial standing for the corporation. Starting operations on July 1, 1934, with a net indebtedness of some $2,800.00, the books at the beginning of the fiscal year of 1935 showed a cash balance of more than $16,000.00 with all indebtedness paid off. At the end of this fiscal year, December 31, 1935, the cash balance was in excess of $36,000.00. During 1935 some $50,000.00 had been paid for hospital benefits to its members; $18,000.00 was paid as salaries to the clerical staff employed; and a $1,000.00 item of rent had also been paid. These constituted the major items of the report. The entire audit of the corporation's books had been prepared and certified by a reputable firm of certified public accountants. Strict account of all monies is carefully maintained; all employees handling the Corporation's funds are bonded and insurance is in force to guard against possible loss by fire or theft. All but a few thousand dollars of the Corporation's funds are on cash deposit at the Riggs National Bank; these few thousand dollars are represented by United States Government Bonds.

In conclusion, we, the members of this committee, feel that Group Hospitalization, Inc., has done and will continue to do a splendid work in the community. We feel that it has been conceived and planned with vision and that its officers and directors are to be congratulated for their public spirit and integrity and for the very considerable amount of energy and time they have given gratuitously to the organization. Group Hospitalization, Inc., therefore, merits the continued support and confidence of the local medical profession.

William M. Ballinger, M.D., *Chairman*,
Committee on Group Hospitalization, Inc.

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* Obtainable from the American Medical Association headquarters, 535 North Dearborn Street, Chicago, Illinois, suitable for framing.

† Report of the Society's Committee on Group Hospitalization, Inc.

ACTIVITIES OF SECTIONS

Section on Internal Medicine

The regular meeting will be held on Friday, May 29, 1936, in the Library of the Medical Society Building. The program:

1. "Dermatology in its Relation to General Medicine." Russell J. Fields, M.D.
2. Election of officers.

Section on Ophthalmology & Otolaryngology

The result of the election of officers is as follows:

David Davis, *Chairman*
E. G. Breeding, *Vice Chairman*
E. J. Cummings, *Secretary*
John H. Trinder, *Treasurer*

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The regular meeting of the Washington Society of Pathologists was called to order at 1:30 P.M., April 4, 1936, in the Army Medical Museum by the President, Dr. Wallace M. Yater. The minutes of the previous regular meeting on March 10, 1936, were read by the Secretary, Captain Elbert DeCoursey, and approved as read. The Secretary read an announcement of the Postgraduate Institute of The Philadelphia County Medical Society, April 20 to 24, 1936, to which the members of the Society were invited. There were 65 members and guests present. Lieutenant Commander G. B. Dowling was elected to membership.

Scientific Paper

"DIETARY FACTORS IN RHEUMATIC FEVER." **M. P. Schultz, M.D.**, National Institute of Health.

In 1933 Rinehart and Mettier described cardiac and arthritic lesions in scorbutic guinea-pigs with co-existing hemolytic streptococcal infections and directed attention to certain points of resemblance between these lesions and those of rheumatic fever in man. Our experiments with guinea-pigs have shown somewhat similar results and in addition have indicated that only a mild degree of scurvy is requisite.

Three grades of chronic scurvy corresponding to 3, 6 and 9 cc. of orange juice were induced in guinea-pigs, and the relative severity of scurvy in each instance was estimated by study of the rate of tooth growth, microscopic changes at the costochondral junctions, and the character of intercostal myositis. The effect of induced and spontaneous chronic hemolytic streptococcal infection was studied in animals with these three degrees of scurvy and in controls. The following conclusions were drawn:

1. Chronic scurvy and chronic hemolytic streptococcal infection acting synergically may result in the production of nonpurulent carditis in guinea-pigs. Valvulitis with fibrinoid degeneration and intense proliferative reaction constitutes the most prominent lesion. These changes are somewhat analogous to those seen in rheumatic fever.
2. For the production of such lesions, chronic scurvy of at least mild degree (that resulting from a restriction of vitamin C intake to an equivalent of 6 cc. of orange juice weekly) is requisite.
3. Both spontaneous hemolytic streptococcal infection in guinea-pigs and that induced in them by inoculation with a strain originally isolated from the lesions of this disease are effective synergically in that species if their onset does not antedate the development of chronic scurvy; but they are ineffective in this respect if scurvy is induced after a certain degree of immunity has been established.
4. Chronic scurvy uncomplicated by infection induces proliferative lesions of minimal extent.
5. In chronic scurvy of even "mild" degree there is extensive myositis of the intercostal muscles and in the neighborhood of the knee joints. In more severe grades of chronic scurvy very slight arthritic changes are demonstrable. These manifestations are apparently unaffected by the presence of infection.
6. Very small localized areas of endocarditis and myocarditis were seen in about one half of the control guinea-pigs. There were lesions of similar character and distribution in scorbutic and infected animals; although in the latter they were somewhat more extensive, and eosinophiles were more frequently present.
7. Slight aortitis was occasionally found in all groups of guinea-pigs examined. The lesions apparently were not affected by the presence of scurvy, infection or both.

The question, however, arises as to whether these induced pathological states are truly rheumatic, and in view of the findings a clinical study of the relationship between chronic scurvy and rheumatic fever was undertaken.

The intake of vitamin C (ascorbic acid) was measured in 30 patients and nonrheumatic individuals, and a method was evolved for testing their relative degree of saturation with this substance. In rheumatic subjects no characteristic abnormality of ascorbic acid metabolism nor deficiency in the body's store of this substance was found.

A group of 57 rheumatic children, some with active disease, was examined periodically for several months, beginning in midwinter. In addition to usual clinical methods of examination the degree of capillary permeability was repeatedly determined in order to detect the appearance of subclinical scurvy. Meanwhile, one half of the children were given large daily doses of ascorbic acid. Slight increases in capillary permeability in the untreated group indicated that among these individuals a mild degree of chronic scurvy developed in early spring; while those receiving ascorbic acid were found to be protected against scurvy. No difference appeared between the groups in the incidence or character of rheumatic disease. Indeed, relapses of acute rheumatic fever occurred in 3 individuals who had received ascorbic acid daily for 2 to 3 months.

In a third group of 15 patients acutely ill with rheumatic fever the therapeutic influence of vitamin C in large daily doses was tested. The vitamin was given in the form of ascorbic acid by mouth and intravenously, and also in large amounts of orange juice. The patients were meanwhile supplied with substances rich in other vitamins. No beneficial effect was apparent upon any manifestation of the disease.

These studies indicate that, despite the suggestive findings in experimental animals, no demonstrable abnormality of vitamin C metabolism is characteristic of rheumatic fever. This vitamin exerts no prophylactic or curative influence in the disease and we conclude that latent scurvy is not an important etiologic factor in rheumatic fever.

In the discussion **Dr. R. M. Choisser** noted the relative absence of rheumatic fever in the tropics and asked if the absence of vitamin D in the diet were of consequence in relation to rheumatic fever. **Dr. Schultz** replied that cases are now being seen in the tropics, and they are less apt to have pleurisy and joint involvement and more apt to have greater proliferative cardiac changes. The effect of vitamin D needs further experimental work, but so far such experiments have given only negative results. **Captain Elbert DeCoursey** stated that in regard to the geographic distribution it has long been taught that rheumatic fever does not appear in tropical countries. Last year when it was intimated to Dr. Ludwig Aschoff that rheumatic fever had been found in Central America, he was skeptical and asked to see some of the tissues. The Panama Canal enterprise has offered an unusual opportunity for the American medical profession to study disease in the tropics. The study of disease is particularly facilitated by the large percentage of deaths which come to autopsy. From 1908 to 1926 no cases of rheumatic fever were recognized at autopsy at the Board of Health Laboratory, Panama Canal Zone. Then 1 case was found by Major P. E. McNabb. On review of a case of adhesive pericarditis that had occurred in 1924, Aschoff bodies were found in the heart muscle. From 1928 to 1932, 3 or 4 more cases were found at autopsy by Major Raymond O. Dart. Meanwhile, Dr. L. Getz, working in the Republic of Panama, found another case. Between 1932 and 1935, while pathologist to the Board of Health Laboratory, Captain DeCoursey found about 5 additional cases at autopsy, only 2 of which had been recognized clinically (1 by Captain Hugh R. Gilmore, Jr.). In Panama the incidence seems to be definitely on the increase and appears to have been absent until the middle 20's. Rheumatic fever occurred almost entirely in black natives from 4 to 10 years of age. As Dr. Schultz said, the main lesions were cardiac, vascular and proliferative, the joints not being involved. It is interesting to note that cases are also being seen by the Columbia University group in Porto Rico. **Dr. Harry H. Donnally** asked what is the value of salicylates in the treatment of rheumatic heart disease? **Dr. Schultz** answered that so far as he knew salicylates had no specific effect but gave symptomatic relief.

Presentation of Cases

The second part of the meeting was called in the histology room at 2:50 P.M.

Dr. R. D. Lillie (for Dr. J. G. Pasternack) presented a case of a tumor of the right kidney, in a white male, aged 39 years, of 6 months known duration, associated with much pain. A large tender mass was felt in the region of the right kidney. Urinalysis showed pus and albumin with some red blood cells. At operation the right kidney was found to be almost replaced by tumor and the surrounding tissues invaded. The diagnosis suggested by Dr. Pasternack was metastatic carcinoma from the prostate, testis or transitional-cell epithelioma. Dr. Lillie thought it more likely a granular-cell carcinoma of multicentric origin in a sclerotic kidney.

In the discussion, **Dr. R. M. Choisser** suggested that the tumor was metastatic and of epidermoid origin. **Dr. Wallace M. Yater** felt that it was metastatic since it was growing through the lymphatics and invading the perirenal tissue. **Dr. Walter Freeman** agreed with the diagnosis of primary tumor of the kidney. **Captain Elbert DeCoursey** also felt that the tumor was of multicentric origin in a sclerotic kidney and stated that he had recently seen a similar case of Colonel F. H. Foucar's at Walter Reed General Hospital.

Dr. Walter Freeman presented 2 cases showing cerebellar atrophy without symptoms. Case 1: L. N., 202, was that of a 52-year old white woman with carcinoma of the breast with metastasis to the lungs and brain. There had been recognized no cerebellar symptoms. The central white matter was particularly affected. The flocculus and vermis, the olives and the dentate nucleus were not involved. Purkinje cells were numerous.

In the discussion **Dr. R. A. Kearny** stated that it would be desirable to have caloric tests of these individuals. **Dr. R. D. Lillie** said that this suggested the results of some chemical poisoning and noted that some toxins had selective action on certain diseases. **Dr. Freeman** added that the Purkinje cells of the cerebellum were atrophic in tropical malaria.

Dr. R. M. Choisser presented a case of a white male, aged 42 years, who was well until 5 months ago. He had eaten crab meat and began to have diarrhea with vomiting; there was some edema. He lost 25 pounds. Again he ate crab meat, with vomiting again, and later swelling of the abdomen. Five liters of fluid were drained off. Eight days later there was some pain in the abdomen with shock, and death. No history of jaundice was obtained. The bromsulphalein test showed

100 per cent retention after 5 minutes and 60 per cent after 30 minutes. The autopsy showed subacute yellow atrophy with miliary tubercle-like nodules in the liver. Thrombosis of the superior mesenteric vein, ascites, and polyserositis were also found.

In the discussion **Dr. R. D. Lillie** noted that again selective action of toxins should be considered. **Dr. Wallace M. Yater** believed the changes in the liver were due to the same toxic agent that caused the portal thrombosis. **Captain Elbert DeCoursey** asked if tubercle bacilli had been demonstrated in the tubercles. **Dr. Choisser** replied that special stains had shown no bacilli. **Dr. Lillie** said that this was another of the many cases in which on microscopic examination a lesion was found whose etiology was obscure and in which no fresh tissue had been preserved for animal injection; therefore, he suggested that at every autopsy material be put into 50 per cent glycerin until the diagnoses are completed.

Captain Elbert DeCoursey presented 3 slides to illustrate the Masson-Trichrome stain using either aniline blue or Licht-Gruen stain for the connective tissue stain. One slide was that of a blackwater fever kidney in which the methemoglobin casts in the Henle loops were demonstrated. Another slide was that of an eye showing a melanoma, and the third slide was that of a pigmented nevus of the skin in which the numerous nervous elements were differentially demonstrated by the red staining, the surrounding fibrous tissue taking the aniline blue stain.

In the discussion, **Dr. R. M. Choisser** stated that the differentiating qualities of the stain were remarkably good and particularly fine in showing the nervous origin of the nevus.

Dr. Wallace M. Yater presented radiograms of a 34-year old colored male who 4 months before had developed gangrene of the toes of the left foot. The radiograms showed evidence of complete occlusion of the left femoral artery below Scarpa's triangle and markedly increased collateral circulation. The right leg appeared normal. Amputation below the knee was advised.

The meeting adjourned at 4:15 P.M.

NEWS AND PERSONALS

Eastern Dispensary and Casualty Hospital

The following staff personnel was recently announced:

General Surgery: Edmund Horgan, *Consultant;* J. G. Lewis, *Chief Surgeon and Chief of Staff;* A. Magruder MacDonald, *Associate in Surgery;* J. Burr Piggott, J. Rogers Young and Russell K. Hollingsworth, *Associates.* Plastic Surgery: William C. Meloy, *Chief.* Neurological Surgery: John J. Shugrue, *Consultant.* Orthopedic Surgery: Guy W. Leadbetter, *Consultant;* Frank M. Hand and Philip O. Pelland, *Associates.* Genito-urinary Surgery: William G. Young, *Chief;* W. Calhoun Stirling, Adam Kemble and Thomas C. Thompson, *Associates.* Ophthalmological Surgery: William Thornwall Davis, *Consultant;* Charles M. Hammett, *Chief.* Surgical Pathology: Tomas Cajigas, *Chief of Laboratory.* Anesthesia: Robert M. Bolton, *Chief;* John R. Dull, Louis Jimal and James C. Waters, *Associates.* Pediatrics: C. B. Conklin, *Consultant.* General Medicine: J. Lawn Thompson, *Consultant;* Homer K. Butler, *Associate.* Obstetrics: Howard F. Kane, *Chief;* Frank W. Braden, *Associate.* Gynecology: Albert E. Pagan, *Consultant;* A. T. Young, *Associate.* Dermatology: C. Augustus Simpson, *Consultant;* H. F. Anderson, *Chief;* Russell J. Fields and H. E. Kittredge, *Associates.* Ear, Nose and Throat: S. A. Alexander, *Chief;* Fordyce A. H. Johnson, Victor R. Alfaro, Allan E. Walker, *Associates.* Radiology: Claude C. Caylor, *Chief;* Casimir Leibell, *Associate.* Dental Surgery: Sterling V. Mead, *Chief;* Howard J. Newton, Daniel F. Lynch, and Leo W. Solbach, *Associates.*

The George Washington University Medical Society meeting was held at the School of Medicine, May 16, 1936. The program:

1. Presentation to the George Washington University of the "Borden Lecture Fund."
   Presentation for the Borden family. William J. Mallory, M.D.
   Acceptance for the University. President Cloyd H. Marvin.
   Biographical Review (Illustrated), "The Career of William Cline Borden." Daniel L. Borden, M.D.
2. Presidential Address. Jeter C. Bradley, M.D.

The Louis Mackall Society held its April meeting at the University Club. The program:

1. "Recent Advances in Endocrinology." Beveridge Miller, M.D.
2. "Operating Technic in Ophthalmology." (Motion Picture) E. Leonard Goodman, M.D.

Election of officers resulted as follows:

Richard W. Wilkinson, *President*
John B. Marbury, *Vice President*
M. W. Glover, *Secretary-Treasurer*

The Society held its annual banquet at the Washington Golf and Country Club on May 21.

The Washington Ophthalmological Society at the regular meeting held on May 4, 1936, at the Episcopal Eye, Ear and Throat Hospital, presented the following program:

1. "Juvenile Macular Exudative Retinitis (Junius-Kuhnt)." Frank D. Costenbader, M.D.
2. "Embolism of Retinal Artery." H. R. Downey, M.D.
3. "Ocular Tumors." Major Raymond O. Dart, Army Medical Museum.
4. "Groenouw's Nodular Dystrophy: Clinical and Pathological Discussion." Benjamin Rones, M.D.
5. "Color Blindness and Anomalies of Vision." Dr. Deane B. Judd, National Bureau of Standards.

Dr. G. J. P. Barger will read a paper, "Fever Therapy in Office Practice," before the American Congress of Physical Therapy in Philadelphia on May 27, 1936.

Dr. James Alexander Lyon read a paper, entitled "Cardiac Pain and Its Significance," before the American Therapeutic Association, Kansas City, Missouri, May 9; also delivered a paper, "Inhibiting Thyroid Activity in the Treatment of Cardiac Insufficiency—Report of Four Cases," before the American Heart Association, Kansas City, Missouri, May 12, 1936.

BOOK REVIEW

PARENTERAL THERAPY. A READY REFERENCE MANUAL OF EXTRA-ORAL MEDICATION, by WALTON FOREST DUTTON, M.D., and GEORGE BURT LAKE, M.D. Springfield, Illinois, Charles C. Thomas, 1936; 376 pages with 90 practical illustrations. Price $7.50.

In this book there is a much needed compilation of modes of therapy other than through oral channels. It is most complete with practical illustrations of modes of procedure including everything from specific instruction of nerve block for painful conditions in various localities to latest methods of treatment of hernia through injection. The matter of treatment of varicose veins and hemorrhoids is gone into with detail. Especial stress is laid on the avoidance of complications. In Part II of the book is an unique alphabetical therapeutic index followed by pharmacologic notes detailing source, action and uses of most of the newest products with the parenteral dosage. By and large this book should prove of great usefulness to anyone who actively is engaged in medical practice regardless of his specialty.

REPRINTS RECEIVED

The following reprints have recently been received for which due acknowledgment is made:

"Eating Utensil Sanitation," James G. Cumming, M.D., Dr.P.H., and N. E. Yongue, American Journal of Public Health, March, 1936.

"Danger Signals: On the Advantages of a Nervous Breakdown, or a Few Neurotic Symptoms in Certain Men under Forty Years of Age," Walter Freeman, M.D., The Diplomate, December, 1935.

"Ventriculography with Colloidal Thorium Dioxide," Walter Freeman, M.D., Herbert H. Schoenfeld, M.D., and Claude Moore, M.D., Journal of the American Medical Association, January 11, 1936.

"The Treatment of Hydrocele and Spermatocele by Injection," Adam Kemble, M.D., Urologic and Cutaneous Review, December, 1935.

Bernard Lauriston Hardin, M. D.

(1870-1936)

Dr. Bernard Lauriston Hardin was born in Lexington, Virginia, June 14, 1870, and died at his residence, 1329 Connecticut Avenue, N. W., on April 29, 1936, from a jejunal hemorrhage. He was the eldest son of Mark Bernard and Mary Payne Hardin. His father, who was graduated from the Virginia Military Institute (first Jackson-Hope medal) in 1858 and served the Confederacy with distinction throughout the war between the states as major of artillery, in 1867 became professor of chemistry at V. M. I., which chair he held for 23 years. Dr. Hardin was also graduated with the degree of B.S. from the Virginia Military Institute and was the recipient of the second Jackson-Hope medal. He obtained his degree in medicine from the School of Medicine of Columbian University (now George Washington University) in 1895. After a residentship in several New York City hospitals he returned to Washington where he began the private practice of medicine. He early became associated in practice with the late Dr. W. W. Johnston, professor of medicine at George Washington University. For some years Dr. Hardin was an instructor in medicine at his alma mater. He became a member of the Medical Association of the District of Columbia in 1898, of the Medical Society of the District of Columbia in 1899, and in 1901 of the Clinico-Pathological Society, of which he was vice president from 1907 to 1910 and president in 1914. For a long period he served on the visiting staffs of Garfield Memorial and Emergency Hospitals. At Emergency Hospital he was consultant in medicine and a member of the board of directors. In 1901 he married Rosalie Taylor Scott, of Warrenton, Virginia, who survives him. He also leaves two sons, Dr. B. L. Hardin, Jr., an active member of the Medical Society of the District of Columbia, and Taylor Scott Hardin; a grandson, Mark Hardin; three sisters and two brothers. His body was interred at Warrenton where he had spent many days of his youth on the farm of his grandfather, Inman H. Payne.

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FORTY-TWO YEARS IN MEDICINE*

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Washington

I have written a rambling paper, mainly in the nature of a review, but partly reminiscent, partly historical and to some extent dealing with matters of current concern, which I wish to present under the title of "Forty-two Years in Medicine." My purpose will be to note and to some extent discuss the main advances in internal medicine during the past four decades—to compare the status of the medicine of today with that of yesterday.

To have practiced medicine before the days of automobiles, telephones and trained nursing seems like harking back to the Middle Ages. With respect to telephones and trained nurses, the implied statement is not literally true. Since the dawn of time women, because of and as a part of their maternal instinct, have assumed the office of caring for the sick; but the great work of that truly wonderful woman, Florence Nightingale, in the Crimean War gave to nursing a new meaning and elevated it to a status of respect and dignity. In America the woeful lack of adequate nursing in the Civil War led to the establishment of training schools shortly thereafter. In 1873 training schools were established in New York, Boston and New Haven. The first organized training school in the District of Columbia was established at Garfield Memorial Hospital in 1889. Up to and including 1893 there had been a total of 14 graduates. There are now in the District of Columbia over 3,000, and in the United States approximately 100,000, graduate nurses, and not a medical activity—doctor's office, home-care of the sick, clinic or hospital—could function without them.

Sphygmomanometry, in its practical application to clinical medicine, dates from 1891, in which year Riva-Rocci devised a blood pressure apparatus with a fluid-filled cuff, which he applied to the arm or finger. Electrocardiography, as applied to clinical medicine, dates from Einthoven's announcement in 1903 of an accurate and usable string galvanometer. Since that time electrocardiographic tracings have become of steadily increasing value in the diagnosis of heart disease. The diseased or functionally disturbed heart has yielded many of its secrets, some of which were unascertainable by any other method of examination, and today electrocardiography is an essential and almost routine part of cardiology.

Bacteriology of today is a distinctly modern science, but its development extended over a period of more than two centuries, and the story of its evolution will always be a source of historical interest. Bacteria were known to exist as long ago as the seventeenth century, but, even so, in the middle of the nineteenth century were known to a comparatively small number of scientists, and then were regarded not as a matter of any particular importance, but merely as curiosities of the microscope, interesting because of their minuteness and motility.

Then, following the studies of Schwann (1837) and of Helmholtz (1843) on fermentation and putrefaction, Pasteur, in 1857, showed that lactic fermentation, and, in 1862, ammoniacal fermentation of urea, were caused by minute organisms. A little later he and Cohn established the relationship between putrefaction and fermentation, namely, that the one was but a special instance of the other, and it became established that putrefaction was possible only in the presence of living organisms.

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* The President's Address, read before the Society, April 8, 1936.

But long before there was any definite conception of a causal relationship between bacteria and disease, it had been suggested that there were resemblances between the phenomena of certain diseases and those of fermentation, and an idea was entertained in a vague way that a virus or contagium might be something in the nature of minute organisms capable of reproducing themselves. In the wake of Pasteur's studies of fermentation, the vagueness of this notion began to diminish, and a definite idea that there might be a causal relationship between bacteria and disease began to take root. Pasteur, French chemist and bacteriologist, at whom Paris laughed, not alone but in greater degree than any other man, had opened the door to the discovery of the etiology of infectious diseases—a discovery not less momentous than any other in the medical annals of all time.

During the period 1880 to 1900 bacteriological laboratories multiplied rapidly throughout the world. Methods of studying micro-organisms were devised; their modes of action in causing disease, having to do especially with toxin formation, were studied; the formation of antibodies in response to bacterial invasions, including opsonins, agglutinins, precipitins and antitoxins, which antibodies acted by destroying the bacteria or neutralizing their toxic products, was proved; and some of the problems of immunity were solved. Metchnikoff's theory of phagocytosis was advanced in 1884 and Ehrlich's side-chain theory in 1885.

During this period the germ theory of disease, as it was called, was the subject of much controversy. Believers increased rapidly, but there were many infidels. A distinguished English surgeon is said to have said that if he could get together enough bacteria to make a poultice of, he would apply them to his next surgical wound.

A few years before the turn of the century bacteriology burst into fruition, and the bacteriologist, who now plays such an important part in our every-day lives in the diagnosis and treatment of disease, came into his own—a fact which brings the subject of bacteriology within the scope of this review.

It is a matter of passing interest to note that Theobald Smith was appointed Professor of Bacteriology in the Columbian (George Washington) University School of Medicine in 1886, and that this was the first Chair of Bacteriology, as such, in America.

Since the pioneer days of bacteriology, the passing years have witnessed many of the truly great advances in medicine, some having to do with a broadening of our knowledge of etiology and the modes of transmission of certain diseases; some with diagnosis, including agglutination and complement-fixation tests and cultures of blood, spinal fluid, excretions, exudates, etc.; some with the discovery of sera for the production of passive immunity and of vaccines for the production of active immunity; some with sanitation, including the purification of water and milk supplies and drainage to destroy the breeding places of mosquitoes; and some with mechanical devices, as the spreading of petroleum on stagnant water to prevent the development of larvae and as screens to shut out disease-carrying pests. Some individual events were of such importance as to call for particularization. Immunizing serum against tetanus was produced by Behring and Kitasato in 1890. In 1894 diphtheria antitoxin had been sufficiently perfected by Behring and Roux to be introduced as a therapeutic agent, and as a result diphtheria began to pass under control and to lose much of its previous dreadful significance. Widal's agglutination test for typhoid fever was announced in 1896. In 1880 Laveran plainly saw living malarial parasites in the blood of a patient, and in 1895–1897 Ross discovered malarial parasites in the bodies of the Anopheles that had been fed on malarial blood—solution of the problem of the two-cycle life of the malarial parasite was at hand, with its tremendously far-reaching significance. In 1900 the United States Army Yellow Fever Commission* working in Cuba, conclusively proved the previously suggested theory that yellow fever was conveyed by the Stegomyia fasciata, and the way was paved for the conquest of another tropical scourge. The Wassermann complement-fixation test for syphilis dates from 1906. Of the vaccines, that against typhoid fever was of greatest importance. The prophylaxis of typhoid fever by inoculation with dead bacilli came into use in America in about 1909, first in the Army, where it was promoted and fostered by F. F. Russell, working in the laboratory of the Army Medical School of this City. In private work vaccination has been fairly general during the past 25 years, and typhoid fever originating in localities where it is practiced is now, generally speaking, a comparatively infrequent disease. But there have been notable exceptions to the general rule—some severe outbreaks in spite of vaccination. When fresh vaccines are not protective, the fault probably lies with the strain or virulency of the organism used or the technic of preparation. There is considerable controversy as to the relative merits of "rough" and "smooth" vaccines. A resurvey of the whole question of typhoid fever prophylaxis is now in progress.

In point of time corresponding roughly to the flowering of bacteriology, there occurred an event of tremendous moment, namely, the discovery on November 8, 1895, of "a new kind of rays" by Wilhelm Konrad Roentgen. On January 6, 1896, news of Roentgen's sensational discovery was flashed by cable from London to the civilized world. Those of you whose professional lives go back to that time will recall how the announcement immediately caught the imagination of an eager public, laymen as well as physicians and other scientists. The discovery was made in a modest German laboratory in the course of experiments with cathode rays. The equipment of the laboratory was simple in kind and much the same as existed in many other laboratories. But it must not be imagined that Roentgen's discovery was a simple matter or a one man's job, for his apparatus, simple as it was, represented the results of the work of numerous other scientists during the preceding three centuries. The work of others, especially Hertz and Lenard, had shown many remarkable phenomena of electrical discharges in evacuated tubes. Others had even approached Roentgen's great discovery, but had fallen short. It is said that the first picture in the world by cathode rays was taken in 1890 in the Physical Laboratory of the University of Pennsylvania by A. W. Goodspeed and W. N. Jennings, but they did not grasp the significance of what they had, and the matter came to naught. Roentgen's discovery was the crowning result of the researches, not of himself alone but also of some of his contemporaries and especially of his "scientific forefathers" (as the Germans say), but it was his own acuity of perception which climaxed the epochal event.

Physiology and biochemistry have contributed generously to the progress of medicine. The older physiologists were fond of comparing the human body, in some respects, to a mechanical engine and spoke in terms of fuel or food consumed, the amount of heat produced by oxidation, the amount of heat convertible into work, etc. Huxley, on observing the power and activities of tugs in warping a large liner into its dock, and having in mind the points of resemblance between the human body and a steam engine, especially the development of power from fuel, is quoted by Murlin as having said, something less than 60 years ago, "Well, if I weren't a man, I think I'd like to be a tug." He also spoke of physiology as "the mechanical engineering of our human machines." Modern physiologists and biochemists would elaborate Huxley's conception of mechanical engineering by adding "chemical engineering," for during the past quarter of a century the contributions of biochemistry to medicine have been of outstanding importance, and the partnership between them has become increasingly intimate.

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* Walter Reed and James Carroll, members of the Commission, were members by invitation of this Society.

From the time of Hippocrates to the early part of the nineteenth century food and some of the problems of nutrition were of philosophical interest. The period of philosophizing then ended. Magendie began feeding experiments on animals. Magendie was truly a pathfinder, for his methods were the beginning of modern research in nutrition, and his work stands out as the dividing line between many centuries of almost barren conjecture and the brilliant achievements of modern physiologists and biochemists. During the late years of the past century the caloric values of many of the ordinary foodstuffs were accurately determined and tabulated; and standard diets were formulated, containing ideal amounts of the three classes of foods to furnish adequate tissue-building material and meet the energy requirements of the body. An outstanding figure in this work was Atwater of the United States Department of Agriculture.

But long in advance of determination of the caloric needs of the body—certainly as long as a century and a half ago and possibly much longer, even back to Hippocrates—there was a feeling that however sufficient in amount a diet might be, there was in addition an elusive something that was essential to normal nutrition, the absence of which was the cause of certain diseases. Supplementing the work of Atwater, Graham Lusk and others, it became the task of physiologists and biochemists to determine the nature of dietary deficiencies responsible for such diseases as scurvy and beriberi. Unable to identify and isolate the causative factors by analytical methods, their mode of attack resolved itself into carefully planned feeding experiments on animals (birds, mice, rats and cattle). Funk, in about 1911, coined the word "vitamine" and applied it to the antineuritic principle contained in the polishings of rice. The name "vitamin" came to stay and has been applied to a number of other principles or substances known, on a basis of animal experimentation, to exist and to be responsible negatively for an important group of diseases. A number of vitamins are now proved and are designated by letters of the alphabet. The main diseases known to be due to vitamin deficiency, in addition to scurvy and beriberi, are rickets and pellagra. Scurvy and beriberi, once destructive scourges, are now mainly of historical interest—a knowledge of the vitamins has almost brought about their disappearance in civilized countries; and as a result of Goldberger's work the conquest of pellagra seems assured. With a more complete understanding of the etiology of rickets, it may be said in truth that now no child need have rickets.

Diseases of less importance due to vitamin deficiency are certain pathological changes, chiefly of an epithelial nature, in the eye (conjunctivitis, xerophthalmia), respiratory tract and genito-urinary tract. Involvement of the epithelium of the pelvis of the kidney and the bladder is thought to be the cause of some cases of renal and bladder calculus.

Experiments on rats in 1922 by Evans and Bishop showed that vitamin E deficiency caused sterility in the male and death of the embryo in the female, since when this vitamin has been considered essential to mammalian reproduction and has been designated as the "fertility vitamin." It is quite possible that its further study may throw light upon the physiology of reproduction. Because also of histological changes with respect to cell division which occur in the presence of vitamin E starvation, already it has been suggested that it may prove to be a factor in unraveling the cancer problem.

The rounding up of the vitamins occurred between 1911 and 1922 and was accomplished by Funk, Osborne and Mendel, McCollum and Davis, Evans and Bishop and others. The last word with respect to them has not yet been said. It is not unlikely that they play a rôle in many biological processes that is not now realized. It also may be that additional vitamins will be proved and that their lack will be found to be the cause of, or a causative factor in, diseases with which vitamin association is not now suspected. And also it may be that vitamin intoxications are of more importance than is now known.

Endocrinology has also come into existence mainly in the last four decades. It has been a fertile field for play of the imagination and commercial exploitation. The idea that animal organs contained substances of physiological or therapeutic value is very old, running back through the centuries, not only in the minds of medical men but also even in the minds of savages. The primitive warrior thought he could increase his courage and ferocity by eating the heart of his enemy.

On the other hand, during recent years, work of the most scientific and valuable kind has been done on the secretions of the ductless glands, and endocrinology has attained an exalted status in medicine. The way was led, in some instances, by clinicians. Addison's classical studies of disease of the suprarenals in about the middle of the nineteenth century, Gull's studies of the thyroid in myxedema in 1874 and Marie's studies of the pituitary in relation to acromegaly in 1886 paved the way for later elaborate investigation of these glands. The more recent work has been shared in by clinicians, physiologists and biochemists. The physiologists and biochemists have worked out many of the intricate problems of the hormones and brought the results of their work to the clinicians—each hormone had to be tested in the "crucible of the clinic."

It is generally accepted that the hormones are closely interrelated and act with respect to each other in a reciprocal way or antagonistically, so that if the activity of one gland lags, another, within limits, may overcome the deficiency, and vice versa; and that collectively they form a compensatory system through which the bodily functions are kept in balance. Collectively they are spoken of as the chemical regulators of the body. Their secretions doubtless are essential to all normal metabolic processes, and it is equally certain that endocrine dysfunction is related to many gross pathological processes. It has become increasingly evident that endocrine disturbances are intimately associated with various neoplasms, either as a direct causative factor or as a factor influencing their progress.

Obviously it is only possible to review the endocrine glands in a fragmentary way and with respect only to their grosser aspects. The pituitary gland, prior to 1886 considered a useless appendage of the brain, has come to be recognized as the master member of the endocrine group. The secretion of its posterior lobe has been proved to cause contraction of the arterioles and capillaries, contraction of the uterus and a reduction of the flow of urine. No disease, so far as I know, has been shown to be due to overactivity of the posterior lobe, but there is one disease known to be due to hypofunction, namely, diabetes insipidus, and against it the only known effective therapy is posterior pituitary substance (pressor principle) by injection. The secretion of the anterior lobe has been shown to exert a more or less governing influence over the activities of the other endocrine glands; to control especially general and sexual development; and to influence milk secretion, fat metabolism and carbohydrate tolerance. There are in the anterior lobe three types of cells (chromophile, alpha and beta, and chromophobe), and the multiplicity of its functions has suggested that in its secretion there are multiple principles which differ from each other according to a differing cellular origin.

One adult disease proved to be dependent upon hypofunction of the anterior lobe is known as Simmonds' disease, and a group of diseases beginning during infancy or early childhood characterized by dwarfism and sexual infantilism, with or without obesity, has been proved. This group includes the Lorain-Levi, Fröhlich's and the Laurence-Moon-Biedl syndromes. The two diseases proved to be due to overactivity of the anterior lobe are gigantism and acromegaly. Gigantism probably represents simple hyperplasia; acromegaly perhaps is always due to tumor (functioning adenoma), and deformity of the sella turcica often can be demonstrated by X-ray films.

The thyroid gland has been of special interest since 1895. Following discovery in that year by Baumann that the normal thyroid gland contained iodine and proof by further studies that its action was dependent upon its iodine content, Magnus-Levy showed that the main function of the thyroid was to store iodine and elaborate from it a hormone, which, delivered to the blood current, regulated the rate of metabolism and the production of heat. Another function of the thyroid was shown to be an influence upon growth, a lack of its hormone during infancy resulting in failure of physical, mental and sexual development—which is the picture of the cretin. Other than simple goiter, the two diseases of thyroid deficit are cretinism and myxedema. Treatment of these by thyroid gland substance yields results which are among the most positive in the whole field of therapeutics. And the one disease of overactivity of the thyroid gland is Graves' disease, whatever its pathogenesis may be.

Kendall, in 1915, isolated from the thyroid a crystalline compound containing 65 per cent of iodine, which he named thyroxine and proved to be the active principle of its secretion. Therapeutically it yields the same results as the gland substance. Later Harington succeeded in producing thyroxine synthetically. The total amount of thyroxine in use in the body at any one time is said to be the astonishingly small amount of about one fourth of a grain, but as stated by Hoskins "this pinch of material spells all the difference between complete imbecility and normal health."

The parathyroid glands have proved to be of importance because of their control over calcium concentrations of the blood and bones. It was shown by Gley in 1891 that removal of the parathyroids caused tetany and by McCallum and Voegtlin in 1919 that tetany so caused was due to a fall of the calcium content of the blood. Overactivity of the parathyroids, long continued, has been shown to cause an excess of calcium in the blood and at the same time to have an opposite effect on bone, i.e., to deplete it of calcium; and with drainage of bone calcium to cause excessive excretion of it and phosphorus through the kidneys, resulting not infrequently in the formation of kidney stone. Parathyroid hormone deficit, therefore, is of consequence because of its relation to tetany; parathyroid excess because of its relation to bone disease.

Nervous hyperexcitability, which is the clinical essence of tetany, is considered to be due to a disturbed balance between ionic concentrations of sodium, potassium and hydroxyl on the one hand and of hydrogen and calcium on the other. A lack of parathyroid hormone is but one of numerous causes which may be responsible for such ionic imbalance in the direction necessary to produce tetany—a large majority of cases of clinical tetany is due to some other cause.

Hyperparathyroidism is chiefly of present interest because of its relationship to osteitis fibrosa cystica, a serious bone disease which is characterized pathologically by decalcification with tendency to cyst formation. Whether Paget's disease has a similar etiology is not determined. I have seen one case of Paget's disease which seemed to be associated with hyperparathyroidism, and I know of another patient who is considered to have Paget's disease on one side and osteitis fibrosa cystica on the other. It is possible that the two diseases are different phases of the same process. The usual pathology of the parathyroids responsible for osteitis fibrosa cystica is tumor (usually adenoma). Parathyroidectomy (first done by Mandl in 1926) and X-ray therapy have yielded good results.

There is a relationship of some kind between phosphorus and calcium metabolism and vitamin D. In rickets vitamin D, with ultraviolet radiation, is specific. Experimentally, bone disease caused by parathyroid extract can be closely counterfeited in some respects by vitamin D intoxication. It may be that hyperparathyroidism and vitamin D intoxication act in a similar way by depressing the activity of the specific enzyme, bone phosphatase, which influences directly the concentration of inorganic phosphate.

The suprarenal glands have been of interest since Addison's classical description of the disease which bears his name. The function of the medullary portion is to secrete epinephrine, the action of which, in excess of the physiological output, resembles very closely in effect, if it is not identical with, sympathetic nerve stimulation. More specifically, it accelerates the heart rate, contracts the arterioles and capillaries and raises blood pressure. It also raises the sugar content of the blood, which effect is accomplished by mobilization of liver glycogen. According to Cannon's conception there is no great need of the medullary hormone in times of serene existence, but in times of stress it is secreted in excess, mustering the resources of the organism in such vital acts as combat, flight and pursuit. Not very much is known of any syndrome due to hyperfunction of the adrenal medulla. A group of cases, however, has been reported in which the most constant symptom was paroxysmal hypertension, due, as proved by autopsy or at operation, to medullary tumor.

The secretion of the adrenal cortex was named by Hartman "cortin." The one disease of cortical hypofunction is Addison's syndrome, in which many autopsies have shown destruction in varying degrees, the results more frequently than not of tuberculosis or syphilis. The use of cortical extract in the treatment of Addison's disease has given better results than were otherwise obtainable. Hyperfunction of the cortex, the usual cause of which is tumor, produces some very striking changes, developmental and sexual in kind, depending upon age at the time of onset. In girls before puberty, the stature is large and there is obesity; there develop masculine characteristics, including excess of hair distributed according to male pattern and masculinity of voice; and more especially there is precocious and abnormal development of the external genitalia and mammae. In boys before puberty there is also largeness of stature—not the gigantism of anterior pituitary overactivity, but nevertheless herculean proportions—with excess of hair appearing prematurely and especially with precocious development of the genitals. There are in the literature some very remarkable examples of sexual precocity in both sexes. After puberty evidences of cortical hyperfunction are much the same in kind, only modified by maturity at the time of onset.

The pancreas was first suspected of having a causal relationship to diabetes by Cowley, an English physician, in 1788. This incrimination remained unproved for more than a century; it was then proved, in 1889, by Minskowski and von Mering. The next question was whether the islands of Langerhans which had been described 20 years previously, might not secrete a hormone necessary to carbohydrate metabolism. In 1916 Schafer named the hypothetical substance "insulin." Early attempts to extract insulin failed because contact with the ferments of the pancreatic juice destroyed it. In 1921 Banting and his associates, overcoming one difficulty after another, succeeded in extracting insulin unharmed by ferments—the day had come when diabetes, one of the most destructive of all diseases, was to pass under control. Banting's discovery must for all time be rated as a great biochemical achievement and as one of the greatest of all therapeutic triumphs.

Hematology also has added its quota. With the introduction of the staining methods of Ehrlich a classification of corpuscles became possible and a tremendous impetus was given to study of the formed elements of the blood. As a result of constantly accumulating knowledge of the blood changes of numerous diseases and of modern laboratory technic, more accurate classifications and many refinements of diagnosis have come into existence. But, in spite of these facts, there are still many unsolved and more or less chaotic problems. Blood pictures are encountered which cannot be interpreted in the light of present knowledge.

In recent years the attention of hematologists has been strongly focused on the endothelial cells and elongated reticular cells associated with them, which, from their morphological likeness and related function, wherever situated, were named by Aschoff "the reticulo-endothelial system." They are derived from the embryonic mesenchyme. They are, for the most part, if not exclusively, intravascular and exist in the spleen, lymph glands and other lymphoid structures, liver, bone marrow and adrenal and pituitary glands.

Their chief function is hematopoietic. It is now accepted that the reticulo-endothelium is the birthplace of all blood corpuscles, which is to say that mature blood corpuscles are reticulo-endothelium which has advanced to complete differentiation; and, conversely, it would seem to be true that every reticulo-endothelial cell is a potential blood corpuscle. Why from reticulo-endothelium of the bone marrow come red cells, granular leukocytes and monocytes, while from lymphoid tissue come lymphocytes, is not evident; possibly the determining factor is a subtle endocrine influence. Another function of reticulo-endothelium is phagocytosis. Senescent or injured red corpuscles are phagocytosed, especially in the spleen. Bacteria, dyes and hemoglobin which has been set free in the blood current by hemolysis also are phagocytosed. Still other functions are (1) power to elaborate bile pigment from hemoglobin and possibly even to form bile, (2) power to store iron, as in pernicious anemia, (3) power to store fat, as in lipoidemic diabetes, and the unknown material contained in the Gaucher cells of Gaucher's splenomegaly, and (4) possibly power to produce antibodies against invading bacteria. Knowledge of these functions of reticulo-endothelium is of great interest biologically and may point the way sooner or later to solving practical questions which are now obscure.

The only anemic disease to which reference will be made is pernicious anemia, and concerning it a note only as to liver therapy. Incidentally, the pathogenesis of pernicious anemia is still undetermined. In 1926 Minot and Murphy discovered that pernicious anemia was controllable by liver feeding; and later it was found that liver could be given most effectively parenterally, preferably by intramuscular injection. By liver therapy the blood can be brought back almost invariably to normal or near-normal level and be so maintained, so far as now known, for an unlimited time, with a corresponding return of good general health. The associated achlorhydria does not disappear, and if destructive changes have occurred in the central nervous system, evidence of their existence is apt to persist with little or no improvement. Minot and Murphy's discovery is one of the outstanding therapeutic events of recent years, not comparable to Banting's great discovery, but making one think of that achievement.

One additional therapeutic agent is of such importance as to call for individual mention, namely, salvarsan, the creation of Ehrlich in 1910. Salvarsan and its modifications revolutionized the treatment of syphilis. Prior to discovery of the Wassermann test and of salvarsan, the diagnosis and treatment of syphilis were exceedingly uncertain. Many cases went undiagnosed; a diagnosis was often made when syphilis did not exist; and about the only way to be sure of cure was to go and get it again.

Reference to one other event is unavoidable, namely, the robbing of hookworm disease of its devastating toll. The work of Stiles and Ashford cannot fail to be a lasting benefit to mankind.

These are some of the happenings in medicine during so short a period as four decades. Trained nursing as handmaid to the healing art came into existence. Bacteriology in a modern sense grew from infancy to its present commanding stature, and as a result the specific causes of a long list of diseases were made plain; immunization against such destructive diseases as tetanus, diphtheria and typhoid fever became possible; yellow fever and malarial fever in this country and in some other important parts of the world were bridled; the diagnosis of tuberculosis, typhoid fever, diphtheria, syphilis and a host of other diseases was made easier; diphtheria became curable; preventive medicine with respect to many of the communicable diseases became a reality, and many of the other problems of public health were made solvable. X-rays were discovered. The vitamins were rounded up, and deficiency diseases in large measure went out of existence. The endocrine glands came to be understood with respect to many of their functions and much of their pathology; the status of diabetes mellitus became completely changed—even deadly diabetic coma lost much of its previous terror. A satisfactory treatment to control pernicious anemia was found. The treatment of syphilis was revolutionized. The way was opened for stamping out hookworm disease.

Truly an impressive record! It is good to have lived in such an era. Now and again some one says that the progress of medicine has been greater during the last 50 years than in all previous time. With this view I completely disagree. The fact is that not a single great advance was made suddenly or by chance. Every great advance was a matter of evolution. Everything that was done had to be done in the way it was done—there was no room for short-cuts. If the progress of the world for the last century was sponged out, it is doubtful whether we would be further along in medicine a century hence than we are now. We of today happen to be the beneficiaries of great undertakings which have borne fruit in our time. Many great undertakings are now under way, and looking ahead for another half century it is not unreasonable to hope that such diseases as pneumonia, tuberculosis, cancer, arthritis, cardiovascular disease, valvular heart disease, infantile paralysis and encephalitis—not all of them, to be sure, but some of them, at least—will have passed into the limbo of man's enemies met and vanquished. But be that as it may, the record stands as it is. The economic value of what has been accomplished is enormous, and if it were possible to translate lessened morbidity and a lowered death rate into dollars, the figures would be staggering. Of more importance, the advances which have been made have brought us substantially nearer to the ideal goal of medicine, namely, the prevention of disease, the cure of disease and lengthening of the span of human life.

THE CENTENNIAL OF THE ARMY MEDICAL LIBRARY COINCIDENT WITH THE BEGINNING OF THE FOURTH SERIES OF THE INDEX CATALOGUE

Major Edgar Erskine Hume
Medical Corps, United States Army, Librarian

Washington physicians have the advantage of their colleagues of other cities in several respects, not the least of which is the presence in the National Capital of the largest medical library that has ever been collected. So familiar is the profession of the District of Columbia with the red brick building at Seventh Street and Independence Avenue, S.W., that it may at times be considered a local rather than a national institution. Such is far from the case. This splendid collection of medical literature is available to physicians, medical students and others throughout the country by means of the interlibrary loan system. Except for rare or unbound material, any book in the Army Medical Library may be sent out. The borrower must, of course, bear the transportation costs. But the practitioner or student in the District of Columbia as well as those who come from distances not too great, may use the material at first hand. What an advantage it is to be able to consult the most recent journal article on a subject of interest, along with what has been published throughout the years. The most remarkable feature of the Army Medical Library, however, is its *Index Catalogue*, a mighty bibliography of medical knowledge. In it one may find almost everything in print in the medical sciences, including dental and veterinary medicine, nursing, public health, and kindred subjects. It was the *Index Catalogue* that the late Dr. William H. Welch called "America's greatest contribution to Medicine"; strong words these, but from a man who weighed carefully what he said.

The Army Medical Library is a hundred years old this year. Begun by Surgeon General Lovell, in 1836, it was at first merely a collection of books for the use of his staff. It was literally what it was called for so many years, "The Library of the Surgeon General's Office." Since

1922 it has been officially "The Army Medical Library." The collection at first grew slowly. The first catalogue, a manuscript volume of 1840, contained only 130 titles. At the close of the Civil War a printed catalogue appeared, listing 2,253 volumes. It is this little pamphlet placed alongside of the present 49 ponderous tomes of the *Index Catalogue* of about 1,000 pages each, that forms a fitting monument to one of America's greatest men of science.

COLONEL JOHN SHAW BILLINGS, M.D., LL.D., D.C.L. (1838–1913)

Father of the Army Medical Library

Portrait by Cecelia Beaux, presented to the Library by 260 physicians of America and Britain. Among the British subscribers were Lord Lister, Acland, Broadbent, Ferrier, Flower, Horsley, Humphreys, Little, Paget, Power, Russell, Osler, Reynolds, Smyly and Treves. Among the American donors were Chadwick, Bowditch, Fitz, Guiteras, Hare, de-Schweinitz, DaCosta, Darrach, Dyer, Hurd, Halsted, Jacobi, Janeway, Kelly, Keen, Lewis, Lusk, Mitchell, Musser, McBurney, McGuire, Matas, Sayer, Shattock, Starr and Welch. The only subscriber listed from Washington was Dr. Daniel W. Prentiss, Professor of Materia Medica and Therapeutics at Columbian University.

This man was Dr. John Shaw Billings, a Surgeon in the Army, and who having distinguished himself in the late war, was assigned in Washington to the congenial task of building up a great national medical library. How well he performed this duty! With a fund of about $80,000.00 left over from the Civil War, he was given a free hand by the far-sighted Surgeon General Barnes. The physician of that day had no easy work in learning what had been written about a particular subject. As Billings said: "While there was nowhere in the world a library which contained all medical literature, there was not in the United States any fairly good medical library, one in which the student might hope to find a large part of the literature relating to any medical subject, and that if one wished to do good bibliographical work to verify the references given by European medical writers, or to make reasonably sure that one had before him all that had been seen or done by previous observers or experimenters on a given subject, he must go to Europe and visit, not merely one, but several of the great capital cities in order to accomplish his desire."

Billings was a genius and knew books, as it were, by instinct. Dr. Oliver Wendell Holmes humorously described a visit by Billings to his library in Cambridge; how, directly on entering the room, Billings swept the shelves with a keen glance and selected the most valuable book in the collection, looked at it for a moment, put it back on the shelves, took another look around, and easily found the second book in the scale of values. "Why, sir," said Holmes, "Dr. Billings is a bibliophile of such eminence that I regard him as a positive danger to the owner of a library, if he is ever let loose in it alone!" In those early days the collection was small, but the question of storage space was a serious one. In cramped quarters over the old Rigg's Bank at the corner of Fifteenth Street and Pennsylvania Avenue, the Surgeon General had his office. Here, among other official business, all new accessions of books, pamphlets and theses were ticketed and catalogued, after which they were sent to the Library Hall in Ford's Theater, that melancholy scene of President Lincoln's assassination, by this time used by the War Department largely as a storehouse.

The profession of the country supported Billings' plea for a suitable building. An eloquent plea to Congress was signed on behalf of the American Medical Association, by three of the most distinguished living American physicians, Samuel D. Gross, Austin Flint, and Oliver Wendell Holmes. The Secretary of War, Mr. Robert T. Lincoln, approved the recommendation of Surgeon General Murray, and with the backing of President Arthur, Congress appropriated $200,000.00 with which the present building of the Army Medical Library and the Army Medical Museum was constructed. The building was completed in 1887, and occupied before the Congress of Physicians and Surgeons, of which Billings was president, met in Washington in 1888. A great reception was held there, attended by the leading lights of the American medical profession and many from foreign countries. Among the foreign visitors was the great German military surgeon, Friedrich von Esmarch, known to us for his bandage. The wife of Professor Esmarch was the aunt of the German Emperor William II, and she came with her husband.

In 1871 Billings printed his first catalogue, a 1-volume work of 454 pages. A 3-volume catalogue appeared in 1873–1874. These were book lists only and not comparable to the later publication. Billings envisaged something more than a mere list of books. "Books," he said, "are properly compared to tools of which the index is the handle." He comtemplated the most mighty piece of bibliography ever undertaken in medical science or in any other field. He considered that the profession is entitled to a catalogue in which under both authors and subjects the literature of the world could be found. He wanted the ideas of the leaders of scientific thought in every land, so, in 1876, he published a *Specimen Fasciculus,* as he called it, and submitted it to the medical profession for criticisms and suggestions. That so few changes were made in its style and arrangement was a tribute to the skill of Billings.

The *Index Catalogue* is too well known to make it necessary to describe it or to tell how it should be used. "Its preparation," said Osler, "is Gargantuan." In no other field of knowledge is there a work comparable to it. It is the world's standard of medical bibliography. Billings used to say: "The *Catalogue* is a tool that must be used for a time before you can judge of its merits." Certainly it has been used to that point. Years ago Osler told of how worn and bethumbed were the volumes of the *Index Catalogue* in foreign medical libraries, and the present Librarian has seen the same condition recently in a dozen or so countries. The *Catalogue* as a working tool is in constant use in Tokyo, Stockholm, Buenos Aires and way points, no less than here in Washington.

The *First Series* of the *Catalogue* (16 volumes) was completed in 1895 and Billings voluntarily retired from the Army to accept the chair of hygiene at the University of Pennsylvania. The *Second Series* followed immediately, and appeared, in 21 volumes, from 1896 to 1916. The *Third Series,* 10 volumes, was published from 1918 to 1932. Then governmental funds were withheld and no volumes were published in 1933, 1934 or 1935. Now, fortunately, the first volume of the *Fourth Series* has been issued. This is indeed a milestone in scientific history, and that it serves to mark the hundredth year of the Library's existence is a happy coincidence. During the few times when it seemed that there might be difficulty in continuing the *Index Catalogue,* the medical profession not only of the United States but of the world raised an outcry. "The possibility of being deprived of the *Catalogue* in its present form is horrible to contemplate," wrote Sir Humphrey Rolleston, Regius Professor of Physic at Cambridge. Sometimes it is good to be in danger of a serious loss, in that possession is all the more prized when it can be retained.

In 1879 Billings established another monumental work, the *Index Medicus,* a monthly classified record of the current medical literature of the world. The editorial management was principally in the hands of Dr. Robert Fletcher, a bibliographer of great note, who spent the greater part of his long life on the staff of the

Army Medical Library. He may fairly be called the "Father of the Index Medicus," just as Billings is the "Father of the Army Medical Library," although neither was the founder. Never a government publication, the *Index Medicus* had hard financial sailing from the start. It had many readers but few subscribers, as is the way with bibliographical works. In vain did Osler plead before the American Medical Association that physicians subscribe. It was published successively in New York, Detroit, Boston, Washington, and for a time in Paris. In 1927 it was merged with the *Quarterly Cumulative Index* (founded 1916) of the American Medical Association. The combined periodical, the *Quarterly Cumulative Index Medicus*, was published under the joint direction of the Library and the American Medical Association until December, 1931, when its connection with the Library ceased. The new *Index* is somewhat different in scope from the old one. It is devoted strictly to medicine and not to the broad field of medical sciences. Thus material on dentistry, veterinary medicine, and the borderline medical topics, is omitted, and a somewhat smaller list of journals is indexed than formerly.

"It is difficult to realize what service these two publications have been to science the world over," wrote Professor Adami of McGill in 1914, and, he added, "I would go so far as to say that the outstanding service to medicine by the United States has been this Library with its publications."

The Library has been fortunate in having had the services of a number of outstanding men. Billings, the greatest of these, would have been famous even if he had never developed the Library. He designed the Johns Hopkins Hospital; he directed the vital statistics work of the Tenth and Eleventh Censuses of the United States; his analysis and report had much to do with the transformation of the old Marine Hospital Service to the splendid modern United States Public Health Service; he was an able Professor of Hygiene at the University of Pennsylvania; he had charge of the consolidation of the 3 public libraries of New York City, and the cataloguing of each, and when the present building was completed, became the librarian. He was a founder of many an important scientific society, held membership in the principal learned academies of the world, and had honorary degrees from Edinburgh, Harvard, Budapest, Johns Hopkins, Yale, Munich, Dublin and Oxford. Fletcher, his assistant, was so successful in his bibliographical work that he received the gold medal of the Royal College of Surgeons of England in 1910. This is one of the most prized awards for distinguished medical achievement. In a century it was awarded but 11 times; Lord Lister, Sir James Paget, and men of that ilk being among the recipients. An able assistant and finally successor to Fletcher was Dr. Fielding H. Garrison, famous medical historian. He joined the Library staff in 1891, the year following his graduation in arts at Johns Hopkins University. He devoted his evenings, as one could then, to the study of medicine at Georgetown University, and obtained his medical degree in 1893. "Endowed with a keen intellect, a remarkable memory, tremendous industry, and methodical habits, Garrison became a man of encyclopedic learning," said Ashburn. He is best known for his "History of Medicine" (4 editions) but his work in medical bibliography was no less important. Becoming a commissioned officer during the World War, his connection with the Library continued until his retirement in 1930, after which he was librarian of the Welch Medical Library of Johns Hopkins University until his untimely death in 1935. The celebrated Walter Reed was Librarian of the Army Medical Library at the time of his sudden death in 1902, having held the position but a short time. Of it he had said that at last he had been given the work that he had wanted ever since entering the military service.

The building of the Army Medical Library, as all who visit it well know, has been outgrown—a way that rapidly growing libraries have when there are no facilities for expansion. Land for a new building was purchased by Congress in 1919 adjacent to the Walter Reed General Hospital. The present building must be removed, in accordance with the plans for the parks of the National Capital. When the building is erected at this new site local readers will find many more conveniences than at present, such as ample parking space, the library open in the evening and on Sunday, greater space for readers, especially those engaged in investigations that require the use of material over periods of days or weeks, etc.

Occasionally there has been heard the suggestion that the Army Medical Library be combined with the Library of Congress. The medical profession of the country has always fought such ideas with vigor. When the suggestion was first made resolutions opposing it were drawn by no less a man than Professor Samuel D. Gross, while Drs. W. W. Keen and S. Weir Mitchell moved their passage (1883). Thirty years later we find Dr. Mitchell of the same mind still for in 1913 he wrote: "The Surgeon General's Library is a monumental labor which none will ever better." A consolidation of a specialized with a general library is always detrimental to the former. When the Army Medical Library was but 20 years old (counting from 1865) it contained more medical literature than either the British Museum or the Bibliothèque Nationale de France. "This is very largely due," wrote Billings, "to the fact that while the Washington library is the national collection, it has been kept separate from the general National Library." Even in Britain, for example, physicians find that they have such difficulty in consulting the medical literature in the British Museum that they use rather the much smaller collections elsewhere in London.

In America we have before us for comparison, the development of the 2 largest professional libraries, those of law and medicine. The Law Library of Congress, although established a generation before the Army Medical Library, has not become the leading law library of the United States, much less that of the world. The Harvard Law Library, for example, is almost twice as large. The Law Librarian of Congress, recognizing this, recently wrote of the necessity to "crystallize sentiment throughout the country to the end that the national law library may obtain all the resources necessary to meet the demand upon it, and become as eminent in law as the Surgeon General's Library is in medicine." The Librarian of Congress, Dr. Putnam, likewise realizes this for he wrote: "Even though consolidated with some other library, say a general library like the Library of Congress, it would still require a specialized staff," and should "be administered by those familiar with that field." The Army Medical Library, he continued, "is one of the various specialized collections, for instance that of the Department of Agriculture, that of the Geological Survey, that of the Bureau of Education—which form units outside of the Library of Congress, but which in intimate association and coöperation with the Library of Congress, form the National Library of the United States." The medical profession, particularly that of the District of Columbia, would be loath indeed to see an amalgamation of the Army Medical Library with any other, for in the end its usefulness to them would be lessened. The Library of Congress has never published any index and the indispensable *Index Catalogue* which has become a *sine qua non* of physicians, might disappear.

The advantage to local medical students of the Army Medical Library should be mentioned. Osler used to say that in the development of the library at Johns Hopkins University, "The Surgeon General's Library was so near that it did not seem worth while to spend much on old books." This is equally true of the libraries of Georgetown University, George Washington University, and Howard University, with the difference that it is hardly worth while for them to spend much on modern books either. The students of the Army and Navy Medical Schools and others also know the advantage of the library and the Librarian has each year had the pleasure of describing to the classes the mode of using the Library and its *Catalogue*.

The Army Medical Library obtains practically everything worth while in the field of medical publication, and in its catalogue performs what would seem to be the impossible, i.e., it indexes *every* article in *every* issue of *every* journal in *every* country. Of course this is not literally true for material that appears to be of little value is omitted. So the modern material is at hand. Of the old it is only necessary to quote some of the well-known figures. Medical books published prior to 1500 are called *incunabula,* from the Latin word for cradle, for printing was then in its infancy. There are about 600 medical incunabula known, and there are some 450 in this Library! The Library's collection of French theses is superior even to that of the University of Paris. It has many books of which there are no other known copies, and its files of early medical journals are unrivaled; and so on.

So when the Librarian was able to exhibit the first volume of the *Fourth Series* of the *Index Catalogue* at the recent meeting of the Medical Library Association in Saint Paul, it was received with enthusiasm. It takes its place with those that have gone before and serves the profession in a way that no other publication can. It has a number of improvements that librarians welcome, such as the use of Arabic instead of Roman numerals for volumes, narrowing of the margins, omissions of italics where practicable, and omission of repetitions in the headings, etc. These changes, although they seem trivial to those not familiar with the work, will result in a saving of more than 20 per cent of space. In other words the volume will include a fifth more material.

The Library begins its second century of existence with the resolve to continue its efforts to serve the medical profession as a whole and that of the District of Columbia in particular. Its catalogue is everywhere available, but the Washington physician, dentist, veterinarian, nurse, sanitarian, and others can within a few minutes have first hand contact with the masterpieces of the centuries, as well as the journals of the world that appeared but yesterday.*

THE "COMMON COLD" AND ASTHMA†

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To the lay and professional mind the term, "Common Cold," connotes a distinct clinical entity. The symptomatology of the disease has been adequately described; and so universal is the experience with it that to contract a "cold" is to partake of the common lot. Despite this fact, there exist divergent opinions concerning the etiology, the provoking and exciting factors, the mode of transmission and the prevention of "colds."

It is my purpose to present for consideration a group of patients in whom the advent of the so-called "common cold" initiates the asthmatic state. "A cold in the head brought on my first attack of asthma"; "My asthmatic spells are always associated with head colds"; "I catch cold easily. It starts in my head and works down into my chest, causing asthma"—these are expressions used by patients to indicate their chief complaint.

The classification of this form of asthma is based upon etiological concepts. Accordingly, such terms as "bacterial asthma," "asthma of the infectious type," and "asthmatic bronchitis" have been introduced into the nomenclature. The number of individuals in whom asthma develops as a sequel to a "cold" commands serious attention.

In a study of 455 consecutive allergic patients, 71, or 16 per cent, have indicated that a "cold" is responsible for their asthmatic seizures. Thus, approximatey 1 patient in 7 identifies himself with this group by a simple description of his disability. Forty, or 56 per cent, of the 71 patients are males; the females number 31, or 44 per cent.

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* For detailed account of the Library and its history, see The Military Surgeon, April, 1936.

† Read before the Society, February 12, 1936.

Table 1 shows the distribution of the patients according to sex and age. It is noteworthy that 27 patients are grouped in the first decade, comprising 38 per cent of the total, and that in this group the boys exceed the girls by 13. The second, third, and fourth decades of life have almost equal representation. Only 8 patients are over 40 years of age.

TABLE 1

Distribution of Cases According to Age and Sex

Age Group in Years	Male	Female	Total	Percentage
0–9	20	7	27	38
10–19	8	6	14	20
20–29	4	6	10	14
30–39	5	7	12	17
40–49	3	1	4	6
50 and over	0	4	4	6
Total.....	40	31	71	

TABLE 2

Distribution of Cases According to Age, Sex, and Family History of Allergy

Age Group in Years	Family History Positive				Family History Negative			
	Male	Female	Total	Percentage	Male	Female	Total	Percentage
0–9	14	7	21	41	6	0	6	30
10–19	8	4	12	23	0	2	2	10
20–29	3	4	7	14	1	2	3	15
30–39	2	5	7	14	3	2	5	25
40–49	1	1	2	4	2	0	2	10
50 and over	0	2	2	4	0	2	2	10
Total........	28	23	51		12	8	20	

The hereditary tendency in asthma has been stressed by both the early and recent investigators. It has been shown that 40 to 60 per cent of patients give a postitive hereditary or familial history. This series yields a much higher percentage in that 51 patients, or 72 per cent, have given a positive family history for some manifestation of allergy. Twenty patients, or 28 per cent, have given a negative family history. The presence or absence of an allergic condition in a relative, near or distant, has determined the classification in Table 2.

Table 2, moreover, confirms previous observations relative to the high incidence of asthma and the predominance of males in the first decade of life. It is noteworthy that 21 patients, or 41 per cent, of the total number are children under 10 years of age in the group with a positive family history. Six patients, or 30 per cent, of the total in the group with a negative family history are boys under 10. The latter percentage seems exceptionally high, for the percentage of allergic patients who manifest symptoms within the first decade of life and who have no allergic inheritance has been estimated at 20. However, the limited value of a negative family history as compared with a positive family history is fully realized. Clinical histories will continue to be faulty just as long as human frailty exists. As a corollary to the high incidence of cases in the first decade of life comes the high percentage of cases in which the age, at the onset of the disease, lies within the same period. This is strikingly demonstrated in Table 3. Thus, 34 cases have had their first attack of asthma following a "cold" at some time within the first 10 years of life. In fact, 6 patients have had their first seizure under 1 year of age. These patients under 10 years comprise 66 per cent of the total number of 51 with a positive family history. In the group with a negative family history, there are found 9 patients, or 45 per cent, whose asthma, likewise, made its first appearance within the first decade. Addition of these totals in both groups reveals the inception of the disease to have been under 1 year of age in 8 patients and from 1 to 9 years of age in 35 patients. It follows, therefore, that 43 patients, or 61 per cent, have become asthmatic under 10 years of age.

It is of interest to compare these findings with the results of other investigators. Salter of London in his classic work on asthma (1868) recorded that of 225 "uncomplicated" cases of asthma the disease appeared during the first year of life in 11 patients, and in 60 patients from the first to the tenth year. Accordingly, the total of 71 patients yields a percentage of 32. A later English observer, Coke, reported in 1927 that 411 patients, or 41 per cent, in a series of 1,000 cases of asthma showed initial symptoms of the disease within the first 10 years of life. In the same year, Rackemann in a clinical survey of 1,074 patients at the Massachusetts General Hospital observed that 313 patients, or 29 per cent, had the onset of their disease in the first decade. Of this number, 162 cases had extrinsic asthma, 128 had intrinsic asthma, and 23 were unclassified. In summary, the percentage of 61 of my series of cases of asthma following "colds" with age of onset during the first decade is very much higher than the percentages quoted. This variation is indicated in Table 4. It must be emphasized that my series of cases deals with a special type of asthma—the sequel to the "common cold." The cases summarized by the authors to whom reference has been made include asthma of every type. Accordingly, the question may well be raised whether the "common cold" at present constitutes a greater menace to childhood than it did in Salter's time, 68 years ago.

TABLE 3

Distribution of Cases According to Age of Onset, Sex and Family History of Allergy

Age Group in Years	Family History Positive				Family History Negative			
	Male	Female	Total	Percentage	Male	Female	Total	Percentage
Under 1 year	3	3	6 } 34	66	2	0	2 } 9	45
1–9	21	7	28		5	2	7	5
10–19	0	3	3	6	0	1	1	15
20–29	1	4	5	10	0	3	3	30
30–39	2	4	6	12	5	1	6	0
40–49	1	0	1	2	0	0	0	5
50 and over	0	2	2	4	0	1	1	
Total........	28	23	51		12	8	20	

TABLE 4

Summary of Percentage of Cases of Asthma with Age of Onset During the First Decade

	Year	Total Number of Cases	Number of Cases With Onset in First Decade	Percentage
Salter...............	1868	225	71	32
Coke................	1927	1,000	411	41
Rackemann..........	1927	1,074	313	29
Bernton.............	1936	71	43	61

My patients readily submitted themselves to tests for protein sensitization. The possible alleviation from the recurring distress proved the incentive to an allergic study. The tests were performed by the cutaneous method with epidermal and miscellaneous proteins including house dusts, with representative pollens, molds and protein extracts of food materials. The use of the so-called "bacterial allergens" has been omitted in this study. The results of these tests are embodied in Table 5. It thus becomes evident that in the group with a positive family history 36 patients or 71 per cent have shown positive cutaneous reactions, whereas 15, or 29 per cent, have shown negative reactions. The high percentage of positive reactors is in accord with the concept that the tendency to hypersensitiveness is inherited. Nevertheless, 15 patients exhibited no skin sensitiveness with the antigens employed despite their asthmatic manifestations and positive heredity. In the group with a negative family history, the reverse proportions obtain. Eight patients, or 40 per cent, have shown positive skin reactions, and 12, or 60 per cent, have shown negative reactions to the same antigens. It is, nevertheless, significant that 8 individuals in whom family predisposition plays no part reveal a cutaneous hypersensitiveness. To sum up, 44 in the series of 71 patients, or 62 per cent, have reacted positively, and 27, or 38 per cent, have reacted negatively to the cutaneous application of allergens. These percentages coincide with previous determinations. Walzer states, "It may be conservatively estimated that from one half to two thirds of all asthmatic patients, when tested with the atopens now available for use, manifest definite specific cutaneous reactions."

TABLE 5

Results of Cutaneous Testing for Protein Sensitization

	Family History Positive				Family History Negative			
	Male	Female	Total	Percentage	Male	Female	Total	Percentage
Reactions Positive	23	13	36	71	6	2	8	40
Reactions Negative	5	10	15	29	6	6	12	60
Total	28	23	51		12	8	20	

Total Results

	Male	Female	Total	Percentage
Reactions Positive	29	15	44	62
Reactions Negative	11	16	27	38
Total	40	31	71	

It may not be amiss to cite excerpts from clinical histories which illustrate the varied phases of the type of asthma under discussion. A girl, 4 years of age, has been subject to "head colds" ever since she was 4 months old. Paroxysmal sneezing, stuffiness of nose, and a profuse and clear nasal discharge mark the beginning of her "cold." Within a few hours, chest symptoms appear—wheezing, dyspnea and cough. Fever is absent. The attacks may come at any time of the year, although they are more frequent with the change of seasons. The average duration of an attack is 2 days. The last one occurred on November 20, 1935. It was the most severe and it extended over a period of 4 days. The child seems perfectly well in the interval between attacks.

A boy of 5 suffered from his first experience with asthma at the age of 3. The attack followed a "head cold" which he had "caught from his grandmother." Of equal interest is the history of the onset of asthma in 2 other patients.

A woman, Swiss by birth, with a negative family history of allergy had always enjoyed good health. She was not susceptible to colds. She engaged actively in swimming and mountain climbing. In July, 1934, she sailed from New York for a visit to her home. She contracted a "head cold" while on the steamer. An irritating cough supervened which persisted until her arrival in Switzerland. On the second day of her visit typical symptoms of asthma appeared which confined her to bed for 10 days. Her age at the onset of the disease was 38.

Another patient was a young woman of 23 with a positive inheritance history on the paternal side. She, too, had always enjoyed good health and was not susceptible to colds. In November, 1933, she motored from Washington to Miami. One week after her arrival in Florida, a "head cold" proved to be the forerunner of an asthmatic attack. She was more or less affected by the disease during the 2½ months of her visit. Her age at the onset of the disease was 22.

In sharp contrast with the cases cited above, is the experience of a woman of 56 who had always been susceptible to "head colds," chiefly in the winter. Three months prior to her visit, she "contracted a cold from her daughter" and at the age of 56 suffered from her first attack of asthma.

In this series, the earliest age of onset of asthma as a sequel to the "common cold" is 5 weeks. The maximum duration is 27 years in a patient who is now 29 years of age. His first attack of asthma followed a "cold in the head" at the age of 2. His "colds" are perennial, but more severe and frequent during the fall and winter months. He states, "A cold in the head or throat starts the asthmatic attack."

In the very young patients a fever may usher in the symptoms of the "head cold." The chest symptoms may intervene after a few hours or after 2 to 3 days. Likewise, the period of acute asthma may vary from 2 to 3 days to 2 to 3 weeks. In the majority of patients the winter colds are responsible for the cycle of distressing events. In some patients the change of seasons witnesses the recurrence of asthma. In others, attacks occur irrespective of season.

The clinical evidence, above cited, definitely points to the "common cold" as the important predisposing factor to asthma in this group of patients. The cutaneous tests for protein sensitization have been performed in an effort to determine all factors concerned. It will be recalled that 44 patients, or 62 per cent, in the series have given positive reactions to the various allergens employed. A reaction was adjudged positive if it consisted of a wheal with pseudopodia and a zone of redness, and if it produced a sensation of itching. The allergens which have given rise to positive reactions have been numerous. They include several representatives from epidermal and miscellaneous proteins, from pollens, molds, and food extracts. The inhalant group of allergens yielded more positive reactions than the ingestants; and of the inhalants, the pollens ranked first. Some patients responded positively to 2 or more test substances. In any discussion of the etiology of asthma, the evaluation of skin tests assumes importance. Moreover, the interpretation of skin reactions paves the way for specific or nonspecific therapy. A few case histories will serve to draw attention to the issues involved therein.

A girl of 4 is subject to "head colds" and asthma. The disease is nonseasonal. The pollens of the short and giant ragweed provoke marked positive skin reactions. The mother who has become quite familiar with her husband's autumnal hay fever makes the following comment: "My child is no worse off in August, September and October, during the season when she is exposed to massive doses of pollen." Another case is that of a boy of 4 years. His first attack of asthma appeared in December, 1934, in association with a "head cold." Asthmatic attacks recurred in the following February and April. Then came an interval of freedom from symptoms until November 19, 1935. This child showed a skin hypersensitiveness to silk and to the pollens of the grasses and of the English plantain. Yet he had enjoyed a respite from his asthma during the summer months when the pollens were in the air. The histories of 2 boys, aged 5, are identical with the preceding case. In 1, with a positive inheritance, the disease had been of 2 years' duration. In the other, with a negative inheritance, the disease had been of 3 years' duration. Both boys are susceptible to "colds all year round," but more so during the winter months. Asthma invariably follows the infection. In these 2 patients, all of the cutaneous tests proved negative.

By way of contrast, the history of another boy, aged $5\frac{1}{2}$ years, may be cited. He has had severe perennial asthma for $4\frac{1}{2}$ years. "Catching cold" provokes the attack, and an herpetiform eruption on the nose and chin precedes it. The mother was very anxious to have a complete series of tests performed. Marked positive reactions were obtained with cottonseed, flaxseed, kapok, silk, pyrethrum, the pollens of the ragweeds, maple, oak, sycamore, and birch, and with protein extracts of 21 food substances.

It becomes essential to make a just appraisal of the positive skin tests in the type of patient under discussion. Some authors maintain that there exist a differentiation between "allergic" and "infectious colds." There have been advanced several diagnostic features based on history, clinical course, physical findings, and smears of nasal discharge. These criteria when applied to my series of patients fail to draw any such sharp dividing line. Kahn and Stout have attempted to demonstrate the practical value of the cytological examination of the nasal smear in differential diagnosis between allergy and infection. They include in their summary and conclusions the following statement: "Allergic and infectious rhinitis and sinusitis may exist coincidentally or at alternate periods in the same person." "Conditions such as . . . allergic quiescence and at times intercurrent infections . . . are proof that the absence of eosinophilia at a single examination does not bar allergic rhinitis." These conclusions emphasize the limitations of any single diagnostic procedure.

Let us now consider one important symptom, namely, the sensation of itching of the mucous membranes of the eyes, nose, roof of the mouth, back of the throat, ear canals, and trachea. This symptom has been interpreted as an indication of irritation due to factors outside the body. It is the tissue reaction to a foreign body, as it were. The number of positive skin reactions provoked by the inhalants, it will be remembered, exceeds that of all other allergens. The enumeration of the various symptoms of "colds" which have been elicited from the series of 71 patients is as follows:

		Patients
Paroxysmal sneezing		64
Stuffiness of nose		53
Coryza		60
Lacrimation		32
Itching of:	Eyes	29
	Nose	28
	Roof of mouth	9
	Back of throat	12
	Trachea	6
	Ear canals	16

No single patient, therefore, has exhibited all the cardinal symptoms of a "head cold," and the sensation of itching of various parts of the upper respiratory tract has by no means been a constant feature. On the one hand, 12 of the 27 patients, or 44 per cent, who have shown no evidence of skin hypersensitiveness include in their symptoms itching sensation of some portion of the upper respiratory tract. On the other hand, 17 patients of the 44, or 39 per cent, with positive skin reactions do not complain of any itching of the mucous membrane. Rackemann in his discussion of "winter asthma" and "bacterial asthma in children" states: "In both groups of bacterial asthma are patients with positive skin tests, and yet the diagnosis has been made in spite of this finding. . . . These positive skin tests may well represent a general characteristic of the asthmatic patient rather than a hypersensitiveness which is clinically important."

There is general agreement upon the fact that infection during the course of a "cold" is capable of provoking the asthmatic state. Of several suggestions which have been advanced regarding the mechanism, two are noteworthy. Gottlieb believes that the constant drainage of nasal discharge into the trachea and bronchi infect the mucous membrane and cause repeated attacks of bronchitis. The course of a nasal discharge into the lungs has been experimentally demonstrated with the use of iodized oil. Mullin maintains that the spread of infection to the lungs takes place through the circulation and lymph channels.

In the nonasthmatic, the spread of infection to the chest gives rise to the familiar acute bronchitis, characterized by tightness and rawness beneath the sternum, cough, expectoration, at first scant and later abundant. In the asthmatic, however, the extension of the infection sets into motion the "trigger mechanism" with resultant symptoms totally different from those of acute bronchitis. The picture is that of an individual with a facial expression of intense anxiety due to a sense of impending suffocation. The chest is distended and fixed, and all the accessory muscles of respiration are brought into action. He is unable to move or speak or assume the recumbent posture. Respiration is loud and wheezy. The cough at first is very dry, and expectoration scant and tenacious. The skin is pale and bathed with a cold perspiration.

The dire suffering so typical of asthma is the inevitable lot of a peculiarly sensitized patient when he "catches cold." He may be young or old. He may have a positive inheritance history or a negative history. He may be cutaneously hypersensitive to allergens or he may not. The sum total of his experience is "asthma," "true asthma."

Salter, despite the limited technic of his time, appreciated the underlying pathology of the disease. He observed as follows: "There are two ways in which the vascular condition of the bronchial tubes may be deranged—actively, by inflammation, passively, by congestion: and either seems adequate to the induction of bronchial spasm; the former we see in bronchitis, chronic and acute; . . ." Years later, in 1917, Walker introduced the term "asthmatic bronchitis." Walker's classification of asthma and his interpretation of "asthmatic bronchitis" have aroused objectors. I approve of the term. It describes the cycle of events as above depicted. It should not be used synonymously with "false asthma" or "asthmatoid bronchitis." "Asthmatic bronchitis," moreover, is a term which is noncommittal as to the etiological factor. It does not make the assumptions which are implied in the term "bacterial asthma."

Rackemann classifies "a considerable group of patients whose asthma occurs only after some acute respiratory infection including common colds" as "bacterial asthma." However, the cause of the "common cold" is still a disputed question. The consensus of opinion is that the disease is caused by a filtrable virus. The micro-organisms which have been isolated from the nasal discharge or from the sputum of those infected with colds are often normal inhabitants of the upper respiratory tract. The therapeutic use of vaccines, stock and autogenous, prepared from these organisms has found many proponents and some opponents. Cooke, in criticism of Walker's earlier work, questions whether a positive skin reaction with bacterial proteins in asthmatics has any significance, etiologic or diagnostic. Moreover, Rackemann must have raised in his own mind the question concerning the etiologic relationship of the bacteria, isolated from the sputum of the asthmatic. Under the heading, "The Treatment of Asthma," Rackemann makes the following significant statement: "Vaccines, however, are the substances of chief importance in the nonspecific treatment and the ones in which we ourselves have had most experience." Certainly, it must be admitted that in the realm of bacteriology the successful control and treatment of bacterial diseases rest upon the firm foundation of specificity. Walzer, in a discussion and review of the subject of skin tests with bacterial proteins, concludes: "The specific diagnostic value of bacterial protein skin tests in connection with atopic hypersensitiveness still remains to be demonstrated." Moreover, the use of bacterial proteins or vaccines in the prevention of colds and asthma has given rise to a considerable divergence of opinion as to their efficacy. "Vaccines are ineffective" is the concluding sentence of a chapter devoted to "Common Colds" in a recognized text-book on "Preventive Medicine and Hygiene" (Rosenau).

The causal relationship of the "common cold" to asthma may be summarized as follows: According to one school, the micro-organisms isolated from the sputum are the exciting factors. The other possible view is that a filtrable virus is the contributory factor. In either event the asthmatic paroxysm is the response of an active and sensitive vagus system to a foreign protein. The basis for the sensitive vagus mechanism in the allergic may be dependent upon subtle physicochemical changes.

It is fitting at this time to present a brief résumé of the experiences of an asthmatic boy, aged 12. The family history is negative for allergy. He was subject to "head and chest colds" during the winter season ever since he was 2 years old. These colds were promptly followed by severe asthmatic symptoms. The pinched expression, the undernourished and frail body bore testimony of his serious disability.

On December 19, 1932, he was taken sick with a "very heavy cold." He was first seen 5 days later and the diagnosis of lobar pneumonia was readily made upon physical examination. There was consolidation of the entire right lung. He was immediately hospitalized. On the next day, the right lower chest was aspirated, and a seropurulent fluid was obtained. On January 7, 1933, 17 days from the date of onset, a thoracotomy was performed because of empyema. He was discharged "relieved" on January 23, 1933, 30 days after his admission. Despite the severe clinical course and the overwhelming infection within the right lung and pleural cavity, there was no evidence of asthma. The wheezing, labored breathing, orthopnea and suffocative spasms which characterized his asthmatic attacks were absent. A paradox is thus unexpectedly presented. In this boy, during 9 successive winters, infection with the "common cold" and subsequent extension of infection to the bronchioles promptly provoked the asthmatic state. The next winter, an acute infection which filled the lung alveoli with exudate, organisms and toxic products failed to cause asthma. In the first instance, the asthma-producing mechanism is set into motion; in the latter instance, there is a striking temporary inhibition of the mechanism. Do the qualitative or quantitative differences of the stimuli determine the nature of the response?

The inhibitory effect of a massive lung infection upon a pre-existing asthma, as described above, merits attention. In sharp contrast, the etiologic relationship of acute infections of the respiratory tract to the asthmatic state has impressed itself upon clinical observers. There are asthmatics who definitely trace the onset of their disease to an acute infection, notably whooping cough, pneumonia and influenza. The asthma which supervenes after an interval of a few days to a few weeks from the termination of such infection is apt to be of a severe clinical type. This is especially true of the asthma which follows whooping cough. Peshkin, in an analysis of 100 cases of asthma in children, reports 15 per cent of the cases attributable to whooping cough. This distressing sequel should not be overlooked. It should serve as a plea for the enforcement of prophylactic measures against a serious threat to childhood. Likewise impressive is the large number of young adults whose perennial asthma has been a sequel to pneumonia or to the influenza pandemic of 1918.

During my 10-year association with the Washington Regional Office of the United States Veterans' Administration, I have had ample opportunity to confirm these observations. It will be recalled that only the physically fit have been selected from the youth of the country for active military and naval service in the World War. Nevertheless, the asthmatics who emerged from that war owe their disability in great measure to acute infections of the respiratory tract. The experience of this selected group of individuals reflects the experience of the general community. Accordingly, the following data may serve as a possible index of the extent and degree of disability of the asthma which has followed in the wake of overwhelming pulmonary infections in the community at large. There were 4,644 World War veterans receiving monetary benefit from the Government for asthma as of September 30, 1935. This figure represents 1.2 per cent of the entire World War veterans' group receiving compensation for disability (384, 508). An analysis of the degree of disability caused by asthma reveals the fact that of the group of 4,644 veterans, 61.9 per cent are disabled to the extent of 50 per cent or more, and of this latter group, 29.1 per cent are totally disabled. The annual cost of compensation for veterans suffering from asthma is $2,874,204.00 which is 1.6 per cent of the total cost of compensation for all disabilities ($176,653,080.00). Of the group of 4,644 World War veterans, 4,011, or 86.4 per cent, have established service connection for asthma; 163, or 3.5 per cent, are classed as peace time soldiers whose asthma was contracted while in the service after the World War; and 470, or 10.1 per cent, are receiving compensation for asthma as a nonservice connected disability.

SUMMARY

In the preceding clinical study, attention has been directed to a type of asthma which is a sequel to the "common cold"; 15.6 per cent of 455 consecutive patients belong to this category. The condition is encountered in all age groups, but is more prevalent in the first decade of life. Its control should be included in a child health conservation program. The influence of heredity and the results of tests for protein sensitization have been noted. The divergent views concerning etiology have been discussed. Moreover, the inhibitory effects of an acute pulmonary infection upon a pre-existing asthmatic state have been indicated; and by way of contrast, the rôle of acute infections, such as whooping cough, influenza and pneumonia, in the production of the asthmatic state has been pointed out.

The contrarieties of the disease forcibly recall Salter's characterization: "Asthma is doubly capricious: the disease in general is capricious, and each case is capricious in itself." A problem is thus presented to experimental medicine and a challenge to allergy.

BIBLIOGRAPHY

Coke, F.: Review of 1,000 Cases of Asthma. Brit. M. J., 1927, **1**, 955.

Cooke, R. A.: Studies in Specific Hypersensitiveness. IV. New Etiologic Factors in Bronchial Asthma. J. Immunol., 1922, **7**, 147.

Gottlieb, M. J.: Relation of Intranasal Disease in the Production of Bronchial Asthma; Report of Cases. J. A. M. A., 1925, **85**, 105.

Kahn, I. S., and Stout, B. F.: Allergy and Infection; Practical Value of Cytologic Examination of Nasal Smear in Differential Diagnosis. J. A. M. A., 1932, **99**, 1,494.

Mullin, W. V.: Relations of Paranasal Sinus Infection to Diseases of Lower Respiratory Tract. J. A. M. A., 1926, **87**, 739.

Peshkin, M. M.: Asthma in Children; Incidence and Significance of Various Diseases and Infections, and of Tonsillectomy and Adenoidectomy. Am. J. Dis. Child., 1927, **33**, 880.

Rackemann, F. M.: Studies in Asthma; A Clinical Survey of 1,074 Patients with Asthma Followed for 2 Years. J. Lab. & Clin. Med., 1927, **12**, 1,185.

Rackemann, F. M.: Clinical Allergy, Particularly Asthma and Hay Fever, Mechanism and Treatment. New York, Macmillan, 1931.

Rosenau, M. J.: Preventive Medicine and Hygiene. New York, Appleton-Century, 1935.

Salter, H. H.: On Asthma; Its Pathology and Treatment. London, Churchill, 1868.

Walker, I. C.: Studies on the Cause and the Treatment of Bronchial Asthma. J. A. M. A., 1917, **69**, 363.

Walzer, M., Coca, A. F., and Thommen, A. A.: Asthma and Hay Fever in Theory and Practice. Springfield, Ill., Thomas, 1931.

EXCRETION UROGRAPHY AS A DIAGNOSTIC AID IN URINARY TRACT INJURIES*

REPORT OF TWO CASES

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Injuries to the urinary tract that result in infiltration of urine into the surrounding tissues are difficult to diagnose at just that particular time that diagnosis is of most importance. We are handicapped in our evaluation of these cases because but few physicians see enough of them early to become skilled in interpreting the history and clinical picture. Furthermore, the lesion of the deeply lying urinary tract may often be masked by injuries to the more superficial structures and the whole condition further clouded by shock.

In addition to the history and the usual physical examination, at various times special tests are used to determine if, and how much, the urinary system has been damaged, such as catheterization, injection of measured quantities of fluid, air cystography and even cystoscopy and ureteral catheterization. On occasion any or all of these measures are of value, but always they possess certain surgical disadvantages and uncertainties.

It is the purpose of this report to draw attention to the use of excretion urography in this connection. It is simple to use and can ordinarily be combined with the X-ray examination most accident cases receive. The amount of shock it causes is limited to that produced by the needle puncture. It is free from the objections inherent in all instrumental examinations, and, for the most part, the information derived is positive rather than inferential. Its use is premised upon the fact that the test solution goes where the urine does and that its location can be portrayed upon X-ray films. It may furnish valuable information regarding concomitant urinary tract lesions and thereby fundamentally modify our treatment. McKenna has wisely warned against assuming that the urinary organs were normal before the presenting injury.

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The limitations of the test are those of intravenous urography in general—the kidneys must be able to concentrate sufficiently to make the test solution visible on the X-ray films. Anatomically, it is not to be expected to be of positive value in case the kidney has been torn from its vascular pedicle, nor is it likely that it will show a rupture of the urethra distal to the voluntary sphincter. Theoretically, shock should interfere with the value of the examination. Practically, by the time the patient reaches the hospital and the examining surgeon, shock is sufficiently abated to permit kidney secretion, and the test is feasible. If it is thought unwise to move the patient after he has been put to bed the examination can be made by using a portable X-ray machine.

Indications for urographic examination are, of course, matters of individual judgment. In broad terms, its use would seem indicated in any injury that might involve the urinary tract, especially where the injury is followed by hematuria or inability to void after a reasonable time, and in cases of pelvic fracture, particularly when the descending pubic rami are involved.

It is rather surprising that the literature contains so few references to this employment of intravenous urography. McKenna's article, which seems to have first mentioned it, appeared in 1934. Since then Ewell has reported its use in 4 cases, and Meredith Campbell gives it mention. It is, therefore, to further publicize a worth while procedure, rather than to introduce something new, that the following cases are reported.

REPORT OF CASES

Case 1: (CGH 47-659, H. L.) A white man, aged 36 years, was seen on October 22, 1935, having been injured 6 hours previously. He had been x-rayed on admission to the hospital and found to have an oblique fracture of the right ilium just lateral to the sacro-iliac joint. There was also a fracture through the ascending and descending pubic rami on the left. There was a separation of the symphysis pubis with upward displacement of the right innominate bone. Several hours after being x-rayed it was noted that he had not urinated and showed no desire to do so. On catheterization 6 ounces of bloody urine was obtained, and urological consultation was requested. When seen, the temperature, pulse and respirations were normal. There was a slight generalized abdominal rigidity, and there were no marked tenderness or bruises over the kidneys, bladder or perineum. The impression was that he had a laceration, probably incomplete, of the bladder. Intravenous urography showed a pyriform-shaped bladder with some extravasation along the right side of the pelvis (Fig. 1). Operation showed a fracture of the pubic arch and a 2-inch mid-line rupture of the bladder.

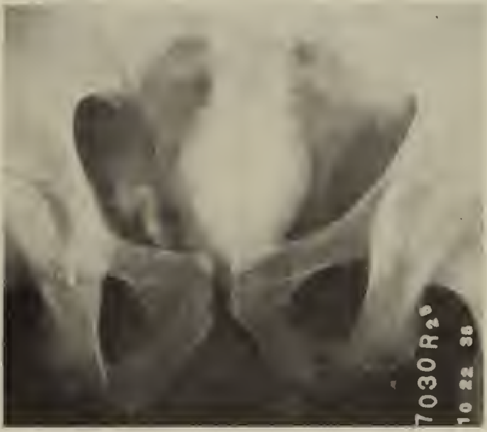

FIG. 1. CASE 1. ANTERIOR MID-LINE RUPTURE OF THE BLADDER

The bladder outline is pyriform instead of the normal globular form. Diodrast has spilled over from blood-filled prepubic space to left side of the pelvis.

Case 2: (CGH 47-025, W. E. M.) A white boy, aged 10 years, was seen first at his home in consultation with Dr. A. A. Shawkey. The patient had been in an automobile accident 8 days previous and had been hospitalized for 6 days with a fracture of the left arm. During his stay in the hospital he had had several intermittent attacks of hematuria. An x-ray film of the spine and kidney regions was reported negative. Preliminary examination gave negative findings except

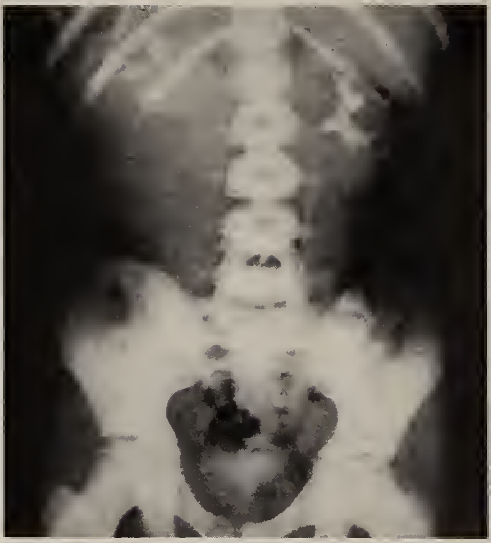

Fig. 2. Case 2. Seven-minute Intravenous Urogram

There is a small sinus extending from the lower major calix of the incompletely filled left kidney pelvis.

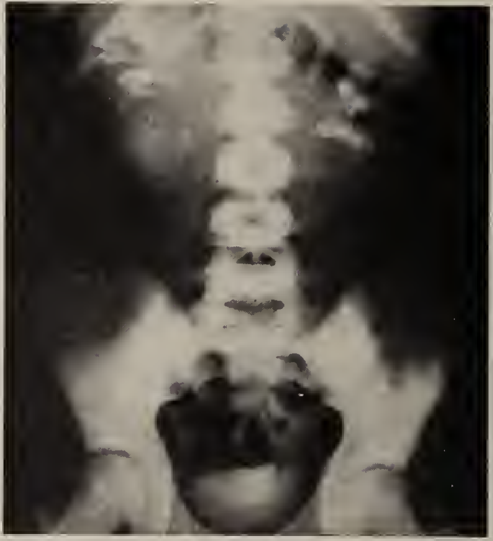

Fig. 3. Case 2. Twenty-five-minute Intravenous Urogram

The collection of Diodrast below and apart from the pelvis indicates urinary infiltration.

in the region of the left kidney. There slight splinting was detected but not enough to prevent palpation of a large doughy mass occupying the site of the kidney. The impression was hematoma, but to rule out any possibility of extravasation, intravenous urography was advised. The next morning, intravenous studies showed an obliteration of the left psoas muscle shadow and a slight extravasation of Diodrast into the renal substance (Fig. 2). The right renal picture was normal. Further studies led to the diagnosis of rupture of the left kidney (Fig. 3), and operation was done at once. The operative findings were a left perirenal hematoma and a rupture of the kidney 1 inch long, located at the lower third, extending outward from the convex border and involving the entire thickness of the kidney. Bleeding had stopped. Clots were evacuated and the kidney region drained. Convalescence was satisfactory.

BIBLIOGRAPHY

Campbell, M. F.: Urologic Injuries. Am. J. Surg., 1935, **30**, 327.

Ewell, G. H.: The Value of Excretion Urography in Traumatic Injuries to the Urinary Tract. Urol. & Cutan. Rev., 1935, **39**, 700.

McKenna, C. M.: Routine Use of Neoskiodan in Suspected Injuries to the Genito-urinary Tract. J. A. M. A., 1934, **102**, 599.

GAS-BACILLUS INFECTIONS

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With the advent of good roads and rapid means of transportation, accidents in rural districts quickly find their way into hospitals in metropolitan areas. These accidents with their associated wounds present a different problem of contamination than those occurring in urban and suburban districts because of the fact that the soil in the rural districts is usually highly fertilized with human and animal excreta. These excreta are notoriously contaminated with organisms of the gas-forming or clostridium group. It is, therefore, not surprising that the literature during the past 5 years is rapidly becoming replete with reports of cases of infection with the organisms of this group. Up until 1932, there were only 600 cases of gas-bacillus infection that had occurred in civil practice reported, and during the past 3 years almost the same number have been recorded. There is no doubt that many more cases have occurred, but there is no way of determining the approximate number, since gas-bacillus infection is not listed as a cause of death in the Bureau of Census mortality tables of the Registration Area of Continental United States.

During the past year and a half, 3 of these cases have come directly under my care, and in making inquiries I have found that during the same period about 10 cases have been treated for gas-bacillus infection in the hospitals of metropolitan Washington. I took it upon myself to further inquire as to the locality of occurrence of the accidents producing the injury which was subsequently followed by gas-bacillus infection, and in all but 2 or 3 cases the accidents occurred in the farming districts of Maryland and Virginia, within a radius of 20 miles of this City. Most of the histories of these cases were briefly as follows: "Left arm lacerated and fractured when caught in belt from flywheel in saw mill," "gunshot wound of thigh while hunting in open field," "fell from motorcycle and skidded along dirt road, lacerating left leg and fracturing left tibia," "left foot fractured and skin lacerated after being struck by automobile while walking along highway."

Some of the accidents occurred within the City limits, but when a comparison is drawn between the number of accidents occurring within the City and those occurring in less populated areas, the incidence of gas-bacillus infection in the latter is overwhelmingly high.

I feel that the reason for the increased number of these cases being reported is twofold, first, because we in civil practice are learning to take cultures and smears of all infected wounds, and secondly, and chiefly, because as each day passes we are seeing more and more horrible mutilating wounds resulting from automobile accidents which greatly simulate war wounds.

Clinically several types of the disease are recognized: (1) The localized anaerobic infection, (2) the "group type," in which a single muscle or a group of muscles is attacked, (3) the "massive type," in which a whole extremity is involved, (4) the fulminating type, in which an overwhelming infection and toxemia occur. This grouping is according to the clinical manifestations of the disease, and the symptoms relative to each group may be caused by any or all of the organisms of the genus Clostridium.

The genus Clostridium has at present about 100 members. Nearly all of the members form gas in certain situations. A notable exception is the Bacillus tetanus. Only about 7 of the organisms are pathogenic to man, the most prominent being Bacillus welchii or perfringens, Clostridium oedematiens and vibrion septique. All of these are saccharolytic and produce gas in wounds. The members of the clostridium group that are nonpathogenic, such as Bacillus sporogenes and Bacillus putrificus are usually proteolytic in character, and although they occur along with the pathogenic organisms in wounds, in themselves they do not cause injury. They are the cause, however, of the foul-smelling odor that arises from these wounds by their fermenting action on proteins, producing indole and skatole.

A point worthy of mention is that the streptococcus is usually found acting in symbiosis with these organisms. In some circumstances it is a "gas former," although it does not belong to the clostridium group. When it does occur in a wound along with such organisms as Bacillus welchii or vibrion septique the most severe type of inflammation encountered in surgery will be seen, the so-called "bronze" inflammation, in which the tissue affected is strikingly red, swollen and edematous.

In practically all cases in which members of the clostridium group are the offending organisms the original injury involves muscle tissue. This statement holds true for the localized as well as the fulminating variety of the disease, and it makes no difference whether the original injury resulted from the insertion of a hypodermic needle or from a massive crushing of an extremity; both wounds are liable to infection by the gas bacilli. Of course, by far the greater number of cases occur after extensive laceration and tearing of tissue such as accompanies and follows a compound fracture or a gunshot wound. A few such wounds reported as being followed by malignant gas formation are: one following the injection of a dose of epinephrine intramuscularly, some resulting from all types of compound fractures, a few postoperative abdominal wounds, uterine lacerations after criminal abortion and postpartum, and all types of wounds involving muscle tissue.

The reason why muscle tissue plays such an important rôle in the development of this disease is because of its high glycogen content. Rettger pointed out in 1906 that the Bacillus welchii and most of the others of the clostridium group never attack proteins if carbohydrates are present and even in the absence of carbohydrates show very slight proteolytic activity. The fermentation of glycogen is accompanied by the production of gas. Many observers claim that the organisms will not involve the skin or ligamentous tissue and that this is the reason why the disease sometimes remains localized. This is aptly demonstrated when the disease finds its portal of entry through a wound of the foot, since in this locality it usually remains localized, being limited from extending to the muscles of the leg by the fascial and ligamentous bands about the ankle joint.

The disease usually manifests itself by regional as well as general signs and symptoms. The regional signs and symptoms indicative of the onset of gas-bacillus infection usually appear within 48 hours after the original infliction of injury, but in some instances may be delayed for 3 or 4 days. The wound usually looks unhealthy and from it oozes a brownish watery discharge. The edges are often at first white and edematous, and if the streptococcus is also present will soon take on a copper-red color of a very severe inflammation. This picture rapidly changes, and the tissues assume a darker bluish-black appearance, become crepitant and tympanitic, and gas bubbles can often be seen arising from the watery humor. The odor arising from the infected area has been described as "mousy" and is quite characteristic. If once encountered it will not soon be forgotten, because, although "mousy" may be a good term, the words foul or fetid are much more descriptive. If the muscle tissue is examined deep within the wound it is found to be dull brown, appearing to have been cooked; it fails to contract when stimulated and will not bleed when cut. Smears taken from the wound at this time show myriads of gram-positive rod-shaped bacilli. Cultures taken on dextrose medium under sterile oil will show evidence of growth within 4 to 5 hours, and the medium in about the same time will be split with gas. If an X-ray film should be taken the muscles will show a clearer outline than normally, with the gas bubbles giving them a foamy white appearance.

The general signs of the infection are modified according to the type of gangrene. In the localized type the general signs are apt to be slight, consisting of a temperature elevation of 101°F. to 102°F. and nausea. The complaint of pain is most striking in this type of infection, since it is usually out of all proportion to the local signs of injury. In a case which is still under care the infection was of the localized and delayed variety, existing only in the foot. The temperature was never above 101°F., but the patient was tossing about in bed in a profound delirium moaning with pain and exhibiting all the signs of a marked toxemia. I mention this case as an exception to show that slight constitutional symptoms do not always accompany the localized type. In the "group type," in which a group of muscles and not the whole extremity is involved, the symptoms of toxemia are more severe, delirium is most always present, and the patient appears in mild shock and usually complains of severe pain. In the "massive type," in which a whole limb or member is involved, the signs of toxemia are marked, with the pulse rate elevated out of all proportion to the temperature, the temperature often being subnormal. Chills are frequent and often the body is bathed in a cold perspiration. This type is always associated with extensive injury involving the main arterial trunks to a part. The fulminating type usually comes on within 8 to 10 hours after the original injury, the gangrenous process spreads rapidly, toxemia is marked and death may occur within 24 hours after the onset of symptoms of the infection. This type is always fatal.

Because of the rapid development of these organisms in a wound and because of the rapidly fatal termination, treatment must be early and vigorous. The best form of treatment in any condition is prophylactic, and this is particularly true in wounds infected with the gas-forming organisms. These organisms are anaerobes and saprophytic, and much can be done to prevent their development. The prophylaxis consists in the careful cleaning of all wounds, and particularly those that are badly lacerated. A débridement should be performed, and all the dead and loose tissue removed, with special care being taken to remove all macerated and loose muscle. The muscle tissue injured can readily be recognized by its dull brick-red appearance, and by its failure to contract and to bleed freely. Muscle tissue exhibiting these signs should be excised until healthy muscle is encountered, that is, muscle which bleeds freely and contracts when cut.

The skin margins of the wound should be loosely approximated with interrupted sutures in order not to seal the wound too tightly from air, and also so as not to injure the blood supply. Special care should be taken in applying splints and bandages. These should be applied in such a way as to allow for swelling, so that the blood supply to the part is not injured or inhibited. A rubber drain should always be placed in the wound even when a débridement has been performed, for this allows for the free entrance of air and for the removal of serum, which when collected beneath the skin forms a good pabulum for the development of bacteria.

If there is some uncertainty as to the thoroughness of the débridement and washing of the wound, Dakin's tubes should be inserted and the wound kept bathed at all times with Carrel-Dakin solution until all possibility of infection has passed. This can be determined by frequent cultures. Most important of all prophylactic procedures is the administration of a dose of mixed gas-bacillus antitoxin (4,000 units) and tetanus antitoxin (1,500 units) in all cases in which wounds are extensive or suspicious.

The curative treatment consists in the immediate and free removal of all infected and involved tissue. In some cases, wide incisions in the skin around the infected area with excision of the involved tissue are followed with recovery. Many surgeons advocate bathing the wound with hydrogen peroxide followed by continuous dressings saturated with potassium permanganate or Carrel-Dakin solution. In the great majority of cases in which the infection has involved a limb, an amputation of some degree must be performed. This should be done well above the infected area in healthy tissue. The wound should be allowed to remain open without an attempt at suturing. As an added precaution, the stump is often bathed in some strong antiseptic solution until all danger of extension of the infection is past.

A most important point in the curative treatment should be emphasized. As soon as the diagnosis of gas-bacillus infection is established, antitoxin should be given. It is questionable how many doses are necessary, but usually a favorable reaction is noted after the second dose. The dosage is either 10,000 or 20,000 units by the intramuscular or intravenous route every 4 to 6 hours until signs of improvement are noted or until 100,000 units have been given. If possible, the first dose should be given even before excision or amputation is performed. However, the operative treatment should in no way be delayed because of the failure of the patient to receive antitoxin. A recent report from the Mayo Clinic shows a marked reduction in mortality in those cases in which antitoxin has been given. In the cases in which the antitoxin was given 86.6 per cent recovered and 13.4 per cent died; in the cases in which antitoxin was not given 55.5 per cent recovered and 44.5 per cent died. These figures more or less correspond in general with reports from various hospitals and clinics throughout the United States. All hospitals and all city health departments should, therefore, be urged to keep a supply of the polyvalent gas-bacillus antitoxin available at all times.

SUMMARY

1. The incidence of gas-bacillus infections has increased with the advent of good roads and the

ever-increasing mutilations associated with automobile accidents.

2. Prophylactic measures such as thorough cleaning and débridement of wounds along with a prophylactic dose of mixed gas-bacillus and tetanus antitoxin aid greatly in preventing the development of organisms of the clostridium group.

3. The mortality rate from this infection, which in the past has been very high, can be greatly reduced by an intelligent combination of the use of antitoxin and surgical measures.

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(*Continued from May, 1936*)

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Deficiency Diseases

In considering the question of deficiency diseases, one is immediately confronted by certain difficulties. The first is the fact that certain diseases, now definitely known to be due to dietary deficiency, have for a long time been considered to be due to certain other definite etiological agents and are still, on account of unsuitable terminology, thought of as due to these agents. An example of this is the so-called "alcoholic" polyneuritis. On the other hand, there are other conditions, such as the spinal cord disease associated with pernicious anemia, in which the evidence, while strongly suggestive of deficiency as an etiological factor, is not yet entirely conclusive.

"ALCOHOLIC" POLYNEURITIS

This extremely widespread affliction is especially common among individuals of alcoholic habits and for many years was considered as being due directly to the toxic effect of the alcohol. As a matter of fact, many physicians are still of this opinion, an opinion which, unfortunately, leads to many therapeutic misadventures. It has been only within the last few years that the true nature of this disturbance has been recognized. During the years of the financial depression it was noticed that many chronic alcoholics who had previously shown no symptoms suddenly developed symptoms of acute polyneuritis. Investigation showed that these individuals, due to their curtailed finances, were faced with the alternative of reducing their fundamental dietary requirements, or of giving up their accustomed dosage of alcohol. Many chose the former alternative, and since their caloric requirements were largely made up by their alcoholic intake, cachexia or other forms of obvious malnutrition were seldom noted. On the other hand, hospital admissions for polyneuritis increased tremendously. It was soon discovered that a high vitamin diet, with special emphasis on vitamin B, rapidly produced improvement in symptoms and eventual cure. Further proof of the true etiology of this condition was found by allowing patients to continue on a high daily alcoholic intake, varying from a pint to a quart of whiskey per day, and at the same time having them consume a diet high in vitamins, especially vitamin B, as well as giving them daily intramuscular injections of liver extract. All of these patients improved just as rapidly as others in whom the whiskey was withheld.

The pathological picture is that of degeneration of the peripheral nerves, especially the more distal portions, and particularly the nerves of the lower extremity. This degeneration affects the myelin sheaths much more markedly than the axis-cylinders. Clinically, the picture is quite striking. The patients complain of weakness, especially of the calf muscles, and very frequently of severe burning pain in the soles of the feet. There is tenderness on deep pressure over the muscles of the calves, and over the nerve trunks, associated with diminution or loss of reflexes, especially the Achilles reflex. One also frequently finds various sensory disturbances in the nature of diminution of sensory response over the distal areas of the distribution of the nerves. Trophic disturbances, such as coldness of the extremities, and dryness and cracking of the skin, is quite common. In advanced cases one sees such disturbances as complete foot drop, as well as involvement of the nerves of the upper extremities. This latter type of wide-spread involvement of peripheral nerves is rather unusual. The diagnosis is usually easy to make and is based on a history of definite dietary deficiency, often combined with alcoholism, the subjective complaint of pain in the lower extremities accompanied by weakness of these extremities, the loss of deep reflexes, especially the Achilles reflex, and sensory disturbances over the distal portions of the limbs. Treatment is by means of a balanced, high vitamin diet with especial attention to vitamin B content. Notwithstanding experimental evidence to the contrary, it is still probably best to remove the alcohol from these patients' diets. The addition of liver extract intramuscularly is indicated in severe cases, although practically all cases improve and are cured on a mere high vitamin diet.

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* This is the ninth instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates. Other instalments will follow until completion.

PELLAGRA

Pellagra is another extremely wide-spread deficiency disease which is due to lack or deficiency of vitamin B in the diet. It is especially common in the southern states, seems to affect women somewhat more than men, and spares no age in life. Within recent years there has been a marked increase in cases of pellagra in the northern and eastern states.

The pathological picture is that of extreme and widespread destruction of the ganglion cells of the cerebrum, and very often of degeneration of the long tracts of the spinal cord, especially the sensory tracts. Clinically, the picture includes a number of symptoms and signs, all of which need not be present in the individual case. These include the cutaneous, the gastro-intestinal, the neurological, and the mental. The disease usually begins insidiously with weakness, loss of weight, diarrhea, and soreness and redness of the tongue. The skin eruption then follows. This usually involves the extensor surfaces of the distal portions of the extremities, especially the hands, but is also seen about the perineum, the inner surfaces of the thighs, the forehead, and the bridge of the nose. The first cutaneous changes appear to be merely an erythema which may closely simulate sunburn. Following this, the skin becomes extremely scaly and assumes a dark brown color. These changes are most marked in the hands. The desquamation of the skin over the forehead and nose is usually less marked, and is described as having a "cornmeal" appearance and feeling. The gastro-intestinal symptoms are those of chronic diarrhea, sometimes accompanied by abdominal pain or distress. Mental symptoms of varying degrees of severity are rather common. These may consist of irritability and depression, of maniacal excitement, of delirium, and sometimes of visual and auditory hallucinations. The neurological disturbances are variable, depending upon the degree of involvement of the central and of the peripheral nervous systems. There may be pain in the extremities, with tenderness on pressure, and loss of deep reflexes. Or, on the other hand, there may be evidence of involvement of the tracts of the cord, such as increase in the reflexes, abnormal reflexes, paresthesias, and sensory disturbances. The diagnosis of pellagra is generally not difficult, and is based on a history of dietary deficiency, gastro-intestinal symptoms such as diarrhea, cutaneous lesions, mental disturbances, and evidence of involvement of the central or peripheral nervous systems. Just as in the so-called "alcoholic" polyneuritis, the treatment consists of a high vitamin diet with a good deal of vitamin B combined with symptomatic treatment. Where cachexia is not pronounced, and where evidence of cerebral degeneration is not marked, the outlook is almost uniformly good.

BERIBERI

Beriberi is another disease due to vitamin deficiency that is fortunately not common in this country. It is found especially in those people who subsist largely on a carbohydrate diet, and it is, therefore, much more prevalent in the eastern countries where a diet of polished rice is almost universal. The morbid anatomy is principally that of degeneration of peripheral nerves, including both myelin sheaths and axis-cylinders. The clinical picture is that of generalized muscular weakness and wasting, accompanied by edema and ascites. Myocardial damage and myocardial failure are also rather common. The outstanding sign of neurological disturbance is a wide-spread neuritis. The neuritis manifests itself by pain in the extremities, loss of deep reflexes, and paralysis spreading from the lower extremities to the entire body. As in other diseases of this sort, the diagnosis is usually easily made by the history of dietary deficiency accompanied by signs of organic disturbance, including wide-spread disturbance in the realm of the peripheral nerves. Treatment is by means of a diet rich in vitamins, and by a period of prolonged rest, until the danger of cardiac decompensation is passed.

SCURVY

This disease, which is one of vitamin deficiency, is rarely met with at the present time, and then usually in children. The etiological factor is that of deficiency in vitamin C. The morbid anatomy referable to the nervous system is usually that of either small petechial, or large hemorrhages in the brain. This complication is fortunately rare. Clinically, the patients usually show the more orthodox symptoms and signs, such as loosening of the teeth, bleeding of the gums, and subperiosteal hemorrhages. With the occurrence of hemorrhages within the central nervous system, the resulting symptoms naturally depend upon the extent and location of the lesion. Fortunately these cerebral hemorrhages are usually small and diffuse and very often leave no permanent residuals. Hemiplegia is an extremely rare complication. The diagnosis is rarely difficult, and the treatment is obvious, namely, the addition of vitamin C, usually in the form of orange or lemon juice to the diet. The prognosis is excellent in the average case.

Congenital and Familial Diseases

Under this heading of congenital and familial diseases will be included as well those diseases of the nervous system that show definite hereditary tendencies.

CONGENITAL MALFORMATIONS

Congenital malformations of the brain and of the spinal cord with their meninges are comparatively common and quite variable. Meningocele and encephalocele are protrusions of the meninges or of the brain itself. These are most commonly found in the frontal, and especially in the occipital region. Corresponding defects may be observed in the spinal cord, usually in the cervical, or especially in the lumbar region. These are accompanied by spina bifida. The true encephalocele is a very serious condition and is usually accompanied by other evidence of cerebral defect, or by other signs of developmental anomalies. A simple cranial meningocele, on the other hand, offers an entirely different picture and may be treated many times successfully by plastic operation. Spinal meningocele, or meningomyelocele with its accompanying spina bifida is often associated with hydrocephalus, as well as with numerous other developmental defects. A common clinical sign of spina bifida is the presence of a tuft of hair over the vertebral defect. Spinal meningoceles and meningomyeloceles often give clinical signs of cauda equina lesions. These are usually in the nature of flaccid paralysis, absence of reflexes, atrophies, incontinence of urine, and disturbances of sensation. As a general rule, these disturbances occur comparatively early, but they may be evident only after a number of years, sometimes as late as the twentieth. Definite diagnosis of the condition and its differentiation from other syndromes affecting the lower cord and cauda equina is made usually by means of the X-ray, which reveals the spina bifida. Treatment is entirely surgical and is most hopeful in cases of simple meningocele. It must be remembered that very occasionally hydrocephalus develops following the operation. When actual cord tissue is included in the sac, the eventual prognosis is almost uniformly bad.

Certain other conditions associated with, or dependent upon, bony deformities may be briefly mentioned. Of these, one is acrocephalia, a condition in which the skull assumes a dome shape. This condition, too, is frequently associated with other developmental defects. Exophthalmos, optic atrophy, and evidence of increased intracranial pressure are common clinical signs. Treatment is usually unsuccessful, but bitemporal decompression may be tried. Another condition is that of the Klippel-Feil deformity. This is a condition in which there is congenital absence of certain of the cervical vertebrae, especially the upper vertebrae, with consequent shortening of the neck. With increasing age there occasionally is seen evidence of progressive compression of the cord. Under such circumstances laminectomy should be performed.

CEREBRAL DIPLEGIA

This condition, which is well known as Little's disease, was for many years commonly supposed to be due to trauma during birth. More exact histopathological investigation, however, has revealed the fact that the basic condition consists of bilateral sclerosis and atrophy of the cortex, and was without evidence of any traumatic process. It may, therefore, be classified as a condition of true cortical agenesis. It seems more prone to affect first-born and premature children. The condition is usually noticed soon after birth, but may become apparent only after several months. There is progressive spasticity, most marked in the lower limbs, with adductor spasm, and "scissors" gait. The deep reflexes are increased, and abnormal reflexes and the Babinski sign are present. Some degree of mental deficiency and a tendency toward convulsive phenomena are frequently noted. In most cases after a certain number of years the progression of the disease stops, and some improvement occurs. In a smaller number of cases progression is continuous. Treatment consists entirely in orthopedic measures.

AMAUROTIC IDIOCY

This condition is hereditary and usually affects several children in one family. The clinical symptoms are usually evident fairly early in infancy, but they may occasionally develop only in the fourth, fifth, or sixth year. They consist principally of progressive blindness, paralysis, and mental deterioration. Ophthalmologically, the striking feature is the presence of a cherry red spot in the macula lutea. The paralysis may be spastic at first, but eventually becomes flaccid, and is usually accompanied by marked muscular atrophy. Treatment is of no avail.

MERZBACHER-PELIZAEUS DISEASE

This is a familial disease which usually begins very early in childhood. The pathological picture is that of a diffuse, generalized degeneration of cerebral myelin sheaths. The clinical manifestations are numerous, such as spasticity, ataxia, nystagmus, optic atrophy, and involuntary movements, demonstrating the diffuse nature of the cerebral involvement. There is no known or successful treatment.

HUNTINGTON'S CHOREA

This condition is a rare, familial, severe, and progressive chorea which usually appears between the ages of 30 and 40. It is generally found in several members of the same family, and, as a matter of fact, in a number of cases is found to be fairly definitely hereditary. The chorea itself resembles that found in other etiological types, and the pathological picture, too, is somewhat similar. There is a marked atrophy of the caudate nucleus and putamen, as well as a generalized cerebral atrophy of somewhat less marked degree. The disease usually begins with difficulty in walking, purposeless movements of the arms, and facial grimacing. Hypotonia and generalized muscular weakness develop gradually. The especially unfortunate distinctive points of this disease are not only that it is progressive, but that severe mental symptoms always appear. While progression of mental symptoms may be slow, eventual complete dementia is always the result. There is no known treatment.

FRIEDREICH'S ATAXIA

Friedreich's ataxia is another familial disease that very often affects several members of the same family. The principal morbid anatomy consists of a degeneration of the spinocerebellar tracts, although the dorsal and lateral columns may also be affected. As a result of this pathological predilection, the predominant clinical picture, namely that of ataxia, is easy to understand. The disease usually begins about the second decade of life, around the time of puberty. It is first manifested by disturbances of gait, difficulty in walking, walking on a broad base, and staggering in all directions. The lower limbs are usually the most affected, but there is also some involvement of the upper extremities. The ataxia is not sensory in nature and is not affected by position or by closing the eyes. Other cerebellar symptoms are extremely common; there is usually dysmetria, adiadokokinesis, decrease or absence of deep reflexes, hypotonia, and nystagmus. For some unknown reason clubfoot or extreme arching of the foot, with hyperextension of the great toe, are almost constant accompaniments of this condition. There is no effect on the mental faculties, and the disease seems to have little effect on longevity. The diagnosis is usually made easily by the history of early onset, the marked ataxia, other cerebellar signs, the hypotonia, and the deformities of the feet. There is no specific treatment.

MARIE'S CEREBELLAR ATAXIA

This hereditary disease strongly resembles the foregoing but presents in addition signs of optic atrophy, disturbances of the extra-ocular muscles, and evidence of involvement of the pyramidal tract. Deformities of the feet are usually absent.

FAMILIAL SPASTIC PARALYSIS

Clinically this condition is almost identical with that of Little's disease and may be distinguished from the latter only by the presence of indications of hereditary or familial tendencies, and a definite progressive course which ultimately leads to death or to total incapacity.

HEREDITARY TREMOR

This rather rare condition usually appears in the ages from 35 to 45 years, is rather definitely hereditary, and is generally not progressive. The tremor appears only on movement, and is never, or only rarely associated with other signs of involvement of the central nervous system. The sedative drugs, especially in combination with phenobarbital and with hyoscine, are often quite efficacious in diminishing or controlling the tremor.

FAMILIAL PERIODIC PARALYSIS

This condition, which is fortunately extremely rare, has a distinct familial tendency. The attacks usually begin early in life and occur with variable frequency. They begin with a feeling of numbness in the legs, which gradually invades the entire body and is followed by weakness, and within a short time, by complete flaccid paralysis. During this stage there may be marked involvement of the respiratory functions, which occasionally cease altogether, resulting in death. The duration of the attacks is uncertain, but only rarely is longer than several hours. Recovery is gradual but usually complete. It may be hastened by the use of injections of pilocarpine.

MYOTONIA CONGENITA

This rare familial disease is also known as Thomsen's disease. It occurs more frequently in males than in females, and is usually first evidenced at the time of puberty or shortly before. The outstanding clinical symptom is that of marked increase in muscle tone which results in difficulty in voluntary movement. The difficulty is most easily noted in the failure to relax after a voluntary movement has been performed. This annoying affliction may affect any muscle, or group of muscles, in the body, but is most frequently noted in the muscles of the extremities, although those of the face and the muscles of deglutition and mastication may be affected as well. The symptoms of myotonia are precipitated or aggravated by emotion and by cold, and are relieved by heat. Treatment, therefore, consists of massage, warm baths, or removal to a warm climate.

PROGRESSIVE LENTICULAR DEGENERATION

This disease is also known by the name of hepatolenticular degeneration or Wilson's disease. It is a severe, progressive, familial, and always fatal disease. It usually affects several members of a family, and, as a general rule, begins about the period of adolescence or shortly thereafter. Pathologically the lesions are fairly well limited to bilateral degeneration of the cells of the caudate and lenticular nuclei of the corpus striatum. Clinically the picture is typically that of an extrapyramidal syndrome. The onset is usually with tremor of the extremities, sometimes of the head. This tremor is noted both at rest and in action. Very soon thereafter there appears a gradually increasing hypertonia, developing into true spasticity and rigidity. With increase in the rigidity contractures practically always develop. The hypertonia and rigidity may involve the muscles of mastication and of deglutition. In a considerable percentage of cases, mental changes occur that may eventually lead to complete dementia. Accompanying the neurological involvement, other organic disturbances usually occur. The commonest of these is cirrhosis of the liver which generally produces no symptoms. In a certain variable number of cases a green line of pigment occurs in the cornea. The disease is fairly rapidly progressive, usually terminating fatally within 3 or 4 years. Diagnosis is sometimes quite difficult, especially when one considers the similarity of the picture to that seen in certain cases of chronic encephalitis. The true diagnosis usually rests on a history of familial incidence, absence of history of infection suggestive of encephalitis, absence of evidence of pupillary or extra-ocular impairment, and on the presence of cirrhosis of the liver. The treatment is uniformly unsuccessful and is purely symptomatic.

PROGRESSIVE MUSCULAR DYSTROPHY

This condition is probably a true myopathy and is, therefore, not of neurogenic origin, but nevertheless it is considered, and is included, among the group of neurological diseases. It usually begins in early childhood and very often affects a number of members of the same family. The pathological picture is that of fragmentation and disappearance of muscle fibers frequently with replacement by fat. The clinical symptoms usually begin with difficulty in walking, a waddling gait, and difficulty in climbing stairs. The muscles of the shoulder and pelvic girdle and the trunk are generally affected first, although occasionally one sees the principal disturbance in the distal muscles, such as the muscles of the calf. The erector spinae group of muscles are usually quite definitely affected rather early in the disease, resulting in a compensatory lumbar lordosis and pot-belly. The weakness is well brought out when the child attempts to rise from a prone position. This he can do only by rolling over on his belly, and as it were, gradually climbing up his legs with his hands. Very often the atrophy of the muscles is masked by the deposition of large quantities of subcutaneous fat resulting in the condition known as pseudohypertrophy. There are no sensory disturbances, but the deep reflexes are usually diminished or completely lost. The only other finding of diagnostic importance is the appearance of large quantities of creatinine in the urine. The disease is generally progressive, although one occasionally sees remissions lasting for long periods of time. In general, the earlier the appearance of symptoms, the more rapid one may expect the progress of the disease to be. As regards therapy, the only procedure of any known value at this time is the administration of large quantities of glycine or amino-acetic acid. The exact action of this chemical is not known, but in a great many cases, and if taken in sufficient amount, the progress of the disease is stopped and even a certain amount of improvement can be noted. The arrest of progression is accompanied by diminution or disappearance of the creatinine in the urine. The dosage of glycine should be at least 10 grams daily, and if possible considerably more. Glycine administration must be continuous, maintained permanently.

WERDNIG-HOFFMANN TYPE OF PROGRESSIVE MUSCULAR ATROPHY

This type of progressive, or spinal muscular atrophy, is entirely similar clinically to the more common type which will be described later. It differs only in its familial or hereditary tendencies and its earlier onset.

GENERALIZED NEUROFIBROMATOSIS

This condition, which is also well known as Recklinghausen's disease, consists of multiple tumors arising from the coverings of peripheral nerves. They are often subcutaneous, may be extremely numerous, and generally give rise to no symptoms. Sometimes, however, they may compress the nerve and cause pain or motor disturbance. Occasionally they arise from the sheath of the auditory nerve, giving rise to symptoms typical of tumors in that location. Treatment depends upon the presence of symptoms and is always surgical.

(*To be continued*)

A Consideration of Renal Glycosuria. (*Work done under the direction of Dr. R. M. Wilder, Division of Medicine.*) J. L. Wade, M.D., Fellow in Medicine, The Mayo Foundation: This brief report deals with the condition known as normoglycemic (renal) glycosuria, a benign type of glycosuria by no means uncommon. Certain diagnostic criteria must be satisfied before making such a diagnosis: 1. Glucose must be present in the urine without other sugars or reducing substances. 2. The curve for blood sugar after oral administrations of glucose should rise from a normal, fasting level for blood sugar of from 80 to 120 mg. per 100 cc. to an alimentary level that may be 180 mg. or more at the half hour period but this should fall to a lower level at the end of the second hour, and at the end of the third hour it should be at, or less than, the fasting level for blood sugar. Sugar must appear in the urine in at least one specimen taken during the test; in other words glycosuria must accompany a normal level of the blood sugar. . . .

Renal or normoglycemic glycosuria may be divided into: (1) The continuous type in which glycosuria occurs in the fasting state as well as after ingestion of meals and, therefore, all of the specimens of urine taken in the course of the glucose tolerance test contain sugar, and (2) the cyclic type in which glycosuria occurs only after ingestion of meals and, therefore, the specimen of urine taken at the beginning of the glucose tolerance test reacts negatively for sugar. In the cyclic type the specimens of urine collected at the end of the second and third hours of the test also may react negatively for sugar.

A previous report by Powelson and Wilder, in 1931, covered 82 cases of normoglycemic (renal) glycosuria observed at the Clinic from 1918 to 1928. The present study concerns 88 "proved" cases of renal glycosuria observed at the Clinic from 1929 to 1934, inclusive. A survey was made of the records for the 6-year period mentioned, of all cases other than cases of proved diabetes mellitus in which a diagnosis of glycosuria had been made. These numbered 339 and included cases of glycosuria of pregnancy, so-called alimentary glycosuria, glycosuria occurring in cases of hyperthyroidism, emotional glycosuria, sapremic glycosuria, and renal glycosuria. A questionnaire was sent to each patient, inquiry being made as to present state of health, symptoms suggestive of diabetes, present weight, familial history of glycosuria or diabetes, recent determinations of blood sugar and recent examination of urine for sugar. In 146 of these cases the diagnosis of renal glycosuria had been made and from these 146 patients 88 replies were received. The information obtained may now serve as a basis for a conclusion as to the correctness of the original diagnosis.

Sixty-six of the 88 patients were males, and 22 were females, a ratio of 3:1. In the report of Powelson and Wilder there were 61 males and 21 females. This seems to establish the predilection of males for renal glycosuria. . . .

Only one case of diabetes mellitus has developed in 170 cases of renal glycosuria (total of the cases in the series of Powelson and Wilder and my series). This is an incidence of only 0.6 per cent, which is not greater than the expectation for the development of diabetes in the population as a whole.

The diagnosis, renal glycosuria, in these cases was based on the oral glucose tolerance test, in which 1 gm. of glucose was given per kilogram of body weight, and specimens of blood and urine were examined before ingestion of the glucose and a half hour, two and three hours afterward. Therefore, it may be concluded that this test is a reliable criterion for this diagnosis. In the past year the Exton or simplified glucose tolerance test has been employed at the Clinic; it requires only three samples of blood and is of only an hour's duration. The results from it agree closely with those of the old three-hour-test. The findings with the Exton test will be the subject of a later report.

Summary.—Renal glycosuria or normoglycemic glycosuria is not an uncommon condition. It represents a type of benign glycosuria which does not predispose to the development of diabetes mellitus. Familial glycosuria is present in many cases. This condition frequently is misdiagnosed as diabetes mellitus and treated as such, with consequent unpleasant results. The test for glucose tolerance as described in this paper yields reliable criteria for the correct diagnosis.

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PROFESSIONAL UNITY

In any organization harmonious action is most necessary for a healthful existence. In just so far as the individual member is interested in and fully cognizant of the policies propounded by its president and its officers or by any of its members, in just so often as he appears at meetings to make his views known, will the larger active units as represented by the various committees be able to accomplish results which will be in conformity with the best interests of all the members. This means that there is to be a sacrifice on the part of many. Social engagements often must be cancelled to attend Society and committee meetings. All egocentric tendencies must fall in the interest of the common good. One way to keep posted is to read carefully not only the Annals, your monthly publication, but to read carefully all communications sent from your Society's office. The agenda for business or stated meetings which reach all active and honorary members must not only be read but studied with a view to being able to come to the meetings with inteligent constructive criticism. What has been accomplished during the past few years and especially during the year now coming to a close has been only through the willingness of individual members to devote unselfishly of their time for support of such common causes as the raising of professional standards through the gaining of basic science laws, the establishment of health security setups, and the securing of adequate appropriations for maintenance of community health. The Society generously voted of its funds in full support of all these projects. These are but a few instances where professional unity has strikingly manifested itself. This work was applauded by both the public and the profession at large. There is nothing more natural than for groups within a large membership to organize with one or more avowed purposes for existence. These groups we believe are not destructive of professional unity but tend to make the individual member within or without the groups more conscious of his obligations so that he will seriously study all proposals and be guided in his action by calm reasoning, not so much by appeals to the emotion. An organization which can bring out to its meetings over 50 per cent of its members, discuss issues of prime importance, enter into joint debate, make decisions and then, no matter whether the result was at variance with the individual's previous opinion, demonstrate solidarity, must be said to enjoy excellent health. This, the heritage of the Medical Society of the District of Columbia established down through more than a century of existence, is greatly prized. Individually members should have an awareness of its full meaning.

To recapitulate, we would say to each member, become informed of all contemplated action, appear at meetings with constructive criticism, say all that is to be said right there. Professional unity does not by any means connote sameness of individual opinion, but it does imply a willingness to act and to think intelligently without any strong emotional influence and a willingness to support the Society's determined policies. Impromptu sessions should be adjourned from hospital lobbies to reconvene with formulated and mature opinions at the business meetings. Good fellowship, good will, components of professional unity, will remain all pervasive.

TRANSACTIONS OF THE SOCIETY

STATED MEETING, MAY 20, 1936

Result of election of officers and committee members:

To serve July 1, 1936 to June 30, 1937:

William Mercer Sprigg, *President*
William P. Herbst, Jr., *First Vice President*
Morris I. Bierman, *Second Vice President*
Coursen B. Conklin, *Secretary-Treasurer*

To serve July 1, 1936 to June 30, 1939:
Members of the Executive Committee:

Sterling Ruffin
Francis X. McGovern
Raymond T. Holden, Jr.

To serve July 1, 1936 to June 30, 1938:
Members of the Compensation, Contract and Industrial Medicine Committee:

Fred R. Sanderson
Paul S. Putzki

Dr. Thomas E. Neill was elected to serve on the Executive Committee the unexpired term (to June 30, 1937) of Dr. Prentiss Willson, resigned.

The following were duly elected to membership, upon recommendation of the Committee of Censors:

Honorary Member

William Creighton Woodward, Chicago, Illinois.

Active Members

Joseph Felix Belair, 1726 Eye Street, N. W.
Crenshaw Douglas Briggs, 1726 Eye Street, N. W.
Radford Brown, 1601 Nineteenth Street, N. W.
Linn Fenimore Cooper, 2222 Que Street, N. W.
James Thomas Jackson, 1621 Connecticut Avenue, N. W.
Leland Ernest Stevenson, 1819 G Street, N. W.
John Francis Warren, 1746 K Street, N. W.

Associate Members

George Elbert Farrar, Jr., 1660 Park Road, N. W.
Morris Kleinerman, Saint Elizabeths Hospital
Felipe Andres Martinez, 4000 Cathedral Avenue, N. W.

Applicants for membership to be voted on in November:

For Active Membership

Morris Chase, George Washington University—1933
Richard Earle deButts, University of Virginia—1934
Frank Whitton Govern, Georgetown University—1933
Stephen Elliott Kramer, Jr., Georgetown University—1933
Mark Perry Schultz, Western Reserve University—1926
Francis Neilson Strawbridge, George Washington University—1932

For Associate Membership

John Nevins Andrews, George Washington University—1916
Read Nathaniel Calvert, College of Medical Evangelists—1924

ACTIVITIES OF SECTIONS

Section on Internal Medicine

The result of election of officers on May 29, 1936, is as follows:

A. J. B. Connolly, *Chairman*
R. Lomax Wells, *Vice Chairman*
Walter K. Myers, *Secretary-Treasurer*

Section on Neurology & Psychiatry

Officers for the year 1936–1937:

Herbert H. Schoenfeld, *Chairman*
James W. Watts, *Vice Chairman*
Antoine Schneider, *Secretary-Treasurer*

THE WOMAN'S AUXILIARY TO THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA

Results of election of officers, held on May 27, 1936:

Mrs. J. Lawn Thompson, *President*
Mrs. Walter Freeman, *First Vice President*
Mrs. Hugh J. Davis, *Second Vice President*
Mrs. F. C. Fishback *Recording Secretary*
Mrs. Coursen B. Conklin, *Corresponding Secretary*
Mrs. Wallace M. Yater, *Treasurer*
Mrs. Lewis J. Battle, *Historian*

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The meeting was called to order at 1:35 P.M., May 2, 1936, by the President, Dr. Wallace M. Yater. There were 10 members present. It was moved by Dr. R. M. Choisser that a farewell dinner for Major Raymond O. Dart be given on the night of June 6, 1936; this was seconded by Dr. J. G. Pasternack and carried. The President appointed a Program and Banquet Committee consisting of Captain Elbert DeCoursey and Dr. R. M. Choisser. The President also appointed a committee for nominating officers as follows: Drs. J. G. Pasternack, Walter Freeman, Captain Elbert DeCoursey, and Dr. Wallace M. Yater, as an ex officio member. Following the announcement of the recent death of the parents of Dr. L. M. Milstead, it was moved by Dr. Freeman, and seconded by Dr. Pasternack, that the Society send a letter of condolence to Dr. Milstead.

Presentation of Cases

Dr. Wallace M. Yater presented 4 cases.

Case 1: Arteriosclerotic occlusion of the anterior tibial artery.

Case 2: Embolism of the popliteal artery.

Case 3: Thrombosis of the popliteal artery.

Case 4: Thrombo-arteritis of the anterior tibial artery in a colored man, aged 34 years.

In the discussion, **Dr. J. G. Pasternack** said that man's present knowledge of vascular pathology did not allow one to come to specific decisions concerning the etiology of the lesions presented in such cases as the last.

Dr. Harry A. Davis presented the gross and microscopic specimens of a kidney from a colored girl, 9 years old, who died apparently of a malignant nephrosclerosis.

In the discussion, **Dr. Pasternack** said that the main change was vascular of both thrombotic and embolic nature and was not limited to arterioles. **Dr. R. M. Choisser** quoted Boyd's text-book, "The Pathology of Internal Diseases," in saying that the blood pressure of over 200 is of arteriosclerotic rather than glomerulonephritic origin. **Dr. Wallace M. Yater** felt that the symptoms in this case were probably due to sudden exacerbation of renal insufficiency.

Dr. D. C. Richtmeyer presented a section from the appendix of a Hebrew girl, 35 years of age, who in November, 1935, had pain in the left lumbar region, hematuria and urinary gravel. Six years before she had had pain in the right upper quadrant of the abdomen. The X-ray examination showed no changes in the genito-urinary or gastro-intestinal tract. It was thought that the patient had gallbladder disease. The appendix showed a carcinoid tumor.

In the discussion, **Dr. R. D. Lillie** said that there was more gland structure present in this case than usual. He suggested a fat stain to show the probable fatty nature of the tumor cells. **Dr. Richtmeyer** noted that some of the tumor cells had invaded the muscularis. **Dr. R. M. Choisser** said that according to MacCallum some of these carcinoid tumors metastasized.

Dr. L. L. Ashburn presented 3 cases.

Case 1: (S-4891) A white man, aged 53 years, a pilot, gave a history of a slow-growing tumor of the roof of mouth for 23 years. It was located on the left side of the hard palate close to the gingival margin. At operation it shelled out easily, was about the size of a golf ball and was very hard. The clinical diagnosis was fibroma.

In the discussion, **Dr. R. M. Choisser** thought that this was a dermoid of teratoid origin. **Dr. R. D. Lillie** thought that the origin was probably periodontal tissue.

Case 2: (S-4893) A white man, aged 36 years, a penitentiary inmate, gave a history of asymptomatic hematuria in 1932 and had passed blood at various times since. At operation the left kidney was found to be about 1½ times normal size and showed a friable papillomatous growth almost filling the lower half of the pelvis. A pea-sized stone was present in the lower portion of the pelvis. Urine analysis showed 2 plus albumen; 1 plus blood cells and many pus cells. The red cell count was 3,910,000. The clinical diagnosis was papilloma of the left kidney, perhaps malignant.

In the discussion, **Captain Elbert DeCoursey** thought that the papilloma was too thick to say that the tumor was benign even though anaplasia was absent and the papillary arrangement was quite regular. He thought the tumor might be called a papillary carcinoma, grade I. **Dr. R. D. Lillie** said that the tumor was finally reported as grade I carcinoma.

Case 3: (S-4894) Slides from the case of a white man, aged 40 years, a penitentiary inmate, showed a small indurated dermal nodule about the size of a pea. In 1933 a "mole" had been cauterized. It had been recauterized in 1934 and again in 1936. The tumor was removed April 21, 1936. It was located in the left pectoral region. The clinical diagnosis was granulation tissue.

In the discussion, **Dr. R. M. Choisser** made the diagnosis of spiradenoma, since the glands showed mucin formation. **Dr. J. G. Pasternack** thought that the tumor was an adenoid type of basal-cell carcinoma.

Captain Hugh R. Gilmore, Jr., presented 2 cases.

Case 1: Sections from the spleen which had been surgically removed from a soldier 37 years of age, who had had service in the tropics, were shown. No history of malaria, fever, hemoptysis, melena or jaundice, was obtainable. Ascites developed in the last month. The liver was not palpated. There was neither anemia nor leukopenia. The weight of the spleen was 2,180 gms. The diagnosis clinically and pathologically was Banti's disease.

In the discussion it was the consensus of opinion that this was the usual picture of Banti's disease.

Case 2: A soldier, aged 22 years, had had no tropical service. In June, 1935, biliary colic and several subsequent attacks with jaundice had occurred, but the patient thought he had had slight jaundice for several years previous. The jaundice became worse after the first attack of colic. There had been frequent indigestion. No clay-colored stools were noted. Increased urobilin was present in the urine. Increased fragility in red blood cells was demonstrated. The liver was not palpable. Gallstones were shown by X-ray and found at operation.

In the discussion, **Dr. R. D. Lillie** said that he could see only congestion in the H. and E. stained section. **Captain Gilmore** added that there was more blood in the pulp than in the sinuses, this being particularly noticeable in the periphery. **Captain Elbert DeCoursey** called attention to the wide separation of the malpighian follicles.

Captain Elbert DeCoursey presented 2 cases.

Case 1: A white man, 51 years of age, for 3 months had had a slow-growing necrotic area over the jaw. In 1 area there was an irregular epithelial growth, but in most areas there was a giant-cell reaction resembling benign giant-cell tumor. The opinion of the group was requested.

In the discussion, **Dr. R. D. Lillie** thought that the epithelial hyperplasia of an adenoid type was on the border-line of cancer, but he found no evidence of giant-cell tumor. **Dr. J. G. Pasternack** thought the diagnosis was clearly that of squamous-cell epithelioma and that the prognosis was distinctly bad. **Dr. R. M. Choisser** thought that the tumor was epithelial, not malignant, but on the border-line.

Case 2: A section was shown from the fascia of the flexor carpi radialis of the left forearm which was taken from a white man 27 years of age. The tumor had been particularly noticed only during the preceding 2 months but had probably been present for several years. An opinion was desired from the Society as to whether anything more than inflammation could be diagnosed.

In the discussion, **Dr. J. G. Pasternack** thought the diagnosis rested between xanthoma and angio-endothelioma. **Dr. R. D. Lillie** thought that it was a tumor of angioid origin, that there was probably more fibrous tissue present than the aniline-blue stain indicated and that he would like to see a silver-stained specimen. **Dr. R. M. Choisser** thought that the diagnosis was xanthoma.

Dr. J. G. Pasternack presented a case of a white man, aged 35 years (N. I. H. S-4836), who had had a sore throat 1 month prior to biopsy. Progressive enlargement of the anterior and posterior cervical lymph nodes had occurred, and these were now very large and tender. This has been accompanied by night sweats, anorexia, headaches, easy fatigue and loss of 15 pounds in weight. The pathologic diagnosis was an early stage of cervical lymphogranuloma. The Frei test was 4 plus. Cunnilinguism was suspected, but the patient refused to say.

Captain Elbert DeCoursey opened the discussion by saying that this slide presented a typical morphologic picture of early lymphogranuloma. However, it was questionable that the histopathologic picture was specific, since the Frei test sometimes even after 3 weeks was not in agreement. The opinion of Dr. Pasternack was desired as to whether he felt lymphogranuloma could be specifically diagnosed histopathologically without the help of the Frei test. **Dr. Pasternack** answered that the morphology was absolutely specific, that the outstanding histopathologic features were edema, fibroblastic proliferation and perivascular round-cell infiltration of the capsule, loss of architecture of the lymph node, proliferation of blood vessels, formation of foci of reticulocytes which later became infiltrated with polymorphonuclear cells and then became necrotic, early hemorrhage in the pulp, binucleated plasma cells, giant cells and an obliterative periangiitis. The Frei test is usually not positive until the twentieth day and is not reliable until after the third or fourth week. **Dr. R. M. Choisser** asked if such a diagnosis would be made in the absence of the positive Frei test. **Dr. Pasternack** answered in the affirmative and stated that the clinical history and therapeutic excision with cure proved the diagnosis. He also pointed out the complication of rectal involvement in the female and not in the male because of the different lymphatic anatomy of the two sexes.

The meeting adjourned at 3:15 P.M.

NEWS

The Washington, D. C., Chapter of the Pan American Medical Association held its last meeting of the season on the evening of April 5, at the Mexican Embassy, through the courtesy of the Ambassador, Dr. F. Castillo Nájera. The meeting was in honor of the delegates to the Third Pan American Conference of National Directors of Health. The program:

1. "Medicine as an International Force." Dr. F. Castillo Nájera.
2. "Pan American Brotherhood in Medicine." Dr. C. E. Paz Soldán of Peru.
3. "How North American and South American Medical Science Complement Each Other." Dr. Waldemar E. Coutts of Chile.
4. "Insect Transmission of Exanthematous Typhus." Dr. Gerardo Varela of Mexico.
5. "Recent Developments in Cuba in Preventive Medicine and Public Health." Dr. F. Domingo Ramos of Cuba.
6. "Present and Future Enterprises of the Pan American Medical Association." Dr. Joseph J. Eller of New York City.

Distinguished guests present included the Ambassador of Cuba, Dr. Guillermo Patterson; the Ambassador of Chile, Sr. D. Manuel Trucco; the Director General of the Pan American Union, Dr. L. S. Rowe. Guests of honor included the Ministers of Public Health of Costa Rica and Nicaragua; the Directors of Public Health of Argentina, Brazil, Cuba, Mexico and the United States; and high public health officials of other American republics. There were also present, Drs. Dean Lewis and Walter A. Dandy of Baltimore; Dr. Louis Mendez, President of the New York Espana-American Medical Society, of New York City; and Drs. W. Wayne Babcock and Chevalier Jackson of Philadelphia. About 100 physicians were present. The meeting was followed by a reception.

University of Maryland Medical Alumni meets at University Hospital, Baltimore, Md., June 4, 1936. Inclusive in the scientific program were:

Dr. Charles Stanley White, "Treatment of Empyema of Rib Resection and Packing," illustrated with lantern slides and motion pictures.

Dr. Wallace M. Yater, "The Value of Arteriography in the Study of Vascular Diseases of the Extremities," illustrated with lantern slides.

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THE DEPENDENCE OF MODERN CIVILIZATION UPON HEALTH*

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Professor of Psychiatry, George Washington University School of Medicine

I consider it a very great privilege to address you this evening. The occasion affords an excellent opportunity to discuss with you the mutual relations of medicine and the general public. These mutual relations are, as a matter of fact, so intimate that I feel sure that the interests of the public and of the medical profession are in a very definite way complementary one to the other. The interest of each, while naturally the concern of each, is, I am convinced, equally the concern of the other; and it is from this point of view that I will briefly discuss their relationships this evening.

To begin with, in order to get some idea of temporal values let me recall some of my own experiences. I entered upon the practice of medicine in 1891 and immediately took up my position as an intern. At that time a great many of the things which have become commonplace in recent years were unknown. The trained nurse was only beginning to be a necessary requirement of hospital practice. Antisepsis was still in its infancy and its technic crude and in process of development, and no two surgeons seemed to have the same idea as to how to go about it. In one operating room we scrubbed our arms with soap and water and then dipped them in bichloride of mercury; in another room we discolored them with permanganate of potash and decolorized them with oxalic acid, much to our personal discomfort. Rubber gloves had not yet been thought of. In our medical school we had one great amphitheater and in that amphitheater surgical operations were performed, operations on cadavers likewise, and the professor of anatomy demonstrated his subject, all on the same table. The amphitheater itself was from modern points of view miserably built. The seats and floors were of wood, and every conceivable thing offended from the standard of construction to which we are accustomed nowadays. We had exceptionally good instruction in obstetrics, but the cesarean section was rarely performed, and then under the most desperate conditions. I myself gave the anesthetic for such an operation, which, if not the first, was one of the earliest to be performed in the hospital. The X-ray had not come into existence and we had to make our diagnoses of fractures largely by the sense of touch, and when we put a limb in plaster we could only hope that the fragments were properly reduced. And, of course, as for the diagnosis of obscure conditions in the body cavities, we were often naturally quite helpless. The wards had their sprinkling of sailors with scurvy and beriberi, the etiology of these diseases being imperfectly known. In fact, scurvy was generally believed to be due only to dietary deficiency because the vitamins were unknown in those days; and the etiology of beriberi was still a matter yet to be disclosed. Typhus fever, while practically unknown, did show its head at least once during my early days in New York, and typhoid fever was very common on the wards of the hospital. Sanitary engineering, the control of water supplies, the prevention of their pollution and the importance of water and milk as carriers had hardly begun to be adequately appreciated. The plasmodium of malaria had only just been discovered (Laveran—1880), but the importance of the mosquito as a transmitter of this disease (Ross—1897) and of yellow fever (Reed and Carroll—1899) was not yet known. The diphtheria organism had only recently been discovered (Klebs—1883), but diphtheria was a universally fatal disease. If our patients with diphtheria did not die we were convinced that we had made a mistake in our diagnosis. There was no sending of swabs to a Health Department Laboratory for diagnostic assistance. We had to make up our minds from the general condition of the patient and the way the throat looked (and, incidentally, take our lives in our hands when we looked at the throat). My teacher, one of the first men to practice intubation, had his little niece "come down" with diphtheria. When he was examining her she coughed in his face; he developed diphtheria and died. This occurred, as near as I recall it, in the summer of 1890, and that was the year in which Behring first treated diphtheria with antitoxin. The gonococcus had only recently been discovered (Neisser—1879), and in particular its relation to blindness (Credé—1884); and the spirochete, the organism that produces syphilis, had not yet been detected (Schaudinn—1905). These are some of the important developments that have happened in the last generation and in my own personal experience. I cite them so that you may have some idea of the approximate state of affairs in the latter part of the nineteenth century and realize the very great progress that has taken place since that time, largely as a result of the impetus communicated to medicine by that great genius, Pasteur. Despite all these advances, however, I read in a recent statement that today we still lose as many as 7,000 mothers annually from puerperal fever, a disease that is practically unknown where obstetrics is practiced with all the modern technic.

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* Read before the Annual Public Meeting of the Society, May 6, 1936.

Anyone who will read descriptions of conditions as they existed during the Middle Ages on the continent of Europe, and try to picture what they were in terms of health and the standards of living to which we are accustomed, can only realize the enormous gap that separates us from those times. During hundreds of years the European continent was swept at frequent intervals by great epidemics, the causes of which were unknown and against which the people were powerless. Wars were almost continuous, and the people lived for the most part in a state of poverty, subjection and filth. Sanitation as we know it today did not exist, and even the palaces of the rich were lacking in the simplest requirements that we associate with ordinary decency and cleanliness. No great city such as the City of Washington could exist in those days for any length of time without being subject to the catastrophies of war and disease; and if there is any proof needed by you of the present day that civilization as we know it required for its development the advances which have been made during these years in sanitary engineering, preventive medicine and the discovery of the etiological factors in epidemic disease, you can recall the story of the Panama Canal. This great enterprise was undertaken by the French and failed miserably, not because of any lack of ability on their part, but because they were incapable of competing with yellow fever and malaria; and it was not until the discovery of the mosquito as the carrier of these diseases that adequate preventive measures could be developed that controlled them. The life history of the mosquito was studied, its breeding places were sought out and it was systematically eliminated. Then and then only was it possible to bring this enterprise to completion. I am reminded by this instance of the fact that it has been seriously suggested that in the struggle for survival the insect may outlive man. There are already some 500,000 known species. Over five-sixths of all the species of living animals in existence belong to the insect realm, and I need only mention some of the problems which confront us in crop control and in cattle raising to indicate their enormous economic significance; and among them the mosquito, the louse, and the tsetse fly are by no means unimportant or antagonists unworthy of our most serious consideration. We have had an illustration only recently of the importance of disease and disease carriers. The floods that swept across the eastern portion of our country only a few weeks ago were followed almost immediately by serious threats of epidemic disease. The causes of these diseases and their carriers have never been eliminated. They have only been kept in suppression by our sanitary methods, and the minute those methods for any reason break down epidemic disease raises its horrid head and begins its work of destruction.

All this I think you will accept as obviously true. The main point, however, which I want to bring home to you is the comparative comfort and even luxury in which we live as compared with only a short time ago, and, too, and more particularly, our freedom from disease, especially epidemic disease. Typhoid fever has been a menace in my own experience, and at times has been endemic in certain localities in the United States. Diphtheria has been a serious menace up to recent years, as I have already indicated; and I am sure that some of you can recall when smallpox scares arose from time to time in the District of Columbia. But these diseases and many others have been brought under control and we are comparatively free from their menace. These results, however, have not been obtained overnight. They have come about only by slow and laborious processes and the gradual stamping into our social patterns of institutions for the protection of the public health. It is notoriously much more difficult to build up organizations to deal with such complex social problems as this than it is to destroy them, and so they have to be protected from year to year with the utmost care, diligence and wisdom. We have all seen in recent years how war may rapidly disintegrate any society, no matter how well organized. All the important and highly technically trained individuals for maintaining the *status quo* in these respects, including the physicians, are drafted for military duty, and the tendency is to let the rest of the population get along as best it can. Even now, 18 years after the close of the war, although we in this country suffered the results of it to the least degree of any of the participating nations, its disintegrating results are still in evidence. It seems, therefore, to need no argument to support the thesis that our health departments throughout the country—state and municipal as well as federal—should receive our most intelligent consideration and support if we expect to continue to carry on in peace and freedom from disastrous disease the various activities incident to the highly complicated social organization of modern civilization. It was Theobald Smith who said: "We are in fact perpetually mortgaged to health."[1]

At this point I can not refrain from indulging in a few statistics. Ordinarily I would hesitate to do this, but these figures are so revealing and illustrate so well what I have been saying that I am quite sure you will agree with me as to their importance. They refer to the City of New York. In 1805 yellow fever caused the death of 344 per 100,000 in that city, and as late as 1822 the rate was as high as 120. Cholera was no infrequent visitor, in 1832 causing 3,513 deaths, which was at the rate of 1,558 per 100,000; and even as late as 1854 it was responsible for 2,500 deaths which, upon the basis of present population, would be equivalent to 28,000 deaths. The Metropolitan Department of Health was established in 1866, and now let us see what happened. Vaccination was introduced into New York City in 1801, but smallpox continued to be an intermittent factor of some importance as late as the 70's, when the number of deaths would have been equivalent, in terms of present population, to 8,000 per annum. There has not been a single death from cholera in the City of New York since 1893 and there has been only 1 fatal case of smallpox since 1912, while during 1935 in the City of New York there were only 65 recorded deaths from diphtheria as against

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[1] McKinley, E. B.: Theobald Smith. Science, 1935, 82, 575.

4,894 in 1881, when the population was less than a third of what it is at present. Surely these figures are a wonderful revelation of what can be accomplished, and not only what can be accomplished but what has been accomplished.[2]

The slowness with which progress takes place in the various departments of health conservation is well illustrated by the fact that still largely throughout the United States health officers are appointed to a considerable extent as the result of political preferences; and only in very recent years has the demand for highly trained, technically qualified men in this field of work been sufficiently widespread to warrant our universities and medical colleges in creating courses especially designed for preparing men for a life work as public health officers, so that now we have a right to look forward to the future with some feeling of certainty that there will be an increasing demand for such highly qualified individuals and that political preference will gradually give way to scientific attainments as the prerequisite qualifications for those who are to be the caretakers of our health.

Now, in all this the means that are employed to bring to pass these ends are not by any means always simple. When a great discovery has been made and accepted it is fairly easy to read about it even in the newspapers, because our newspapers are beginning to appreciate the necessities of reporting scientific advances and are developing a group of men especially qualified for this particular and important public service. But remember that the discovery of great scientific facts is not a simple matter and that before the final word is said with reference to any of them there have been periods of varying length when the several alleged facts and hypotheses were under discussion in the arenas of the various scientific societies throughout the country, until finally the alleged fact receives its stamp of approval and acceptance by the scientific minds qualified to pass upon it. In the process, however, as I have indicated it, many alleged facts are exploited which do not stand the test and which ultimately are eliminated from the picture. Not only this, but the charlatan who battens upon the ignorance of the people and their states of doubt and helplessness in the meantime comes forward with his alleged facts. But, after all, it is not so much the charlatan that we need fear as the uninformed person of perfectly good intentions. As I have been in the habit of saying, the trouble with people is not so much with their ignorance as it is with their knowing so many things that are not so. "Credulity writes testimonials for every delusion."[3] And in all this welter of claim and counterclaim, of disputes and disagreements, of the patient testing of results in the laboratories and their submission to and consideration by highly qualified minds trained for a lifetime to evaluate such matters, who is it that stands out preëminently as the representative of the interests of the people and undertakes to conclude when results have been obtained which are sufficiently convincing to apply in the treatment and prevention of disease? It is, or should be, your Medical Society, because no one is so much interested in the bearing of these scientific discoveries upon disease as the practicing physician, and no one in the community, as a rule, is better able to judge as to their claim. Now, I would not have you think that I believe that all virtues reside in physicians and all things that are not virtue are resident elsewhere. Physicians are like the rest of mankind and make their mistakes and are sometimes lazy and do not act; but it is a well-known principle of the type of social organization under which we live that a body such as a Medical Society, which has public interests at heart, theoretically at least, and public services to render, will do a job that is good, bad or indifferent, to some considerable extent dependent upon the expectations and demands of the community of which it is a part. The law of supply and demand applies not alone in the economic field. It is just as active and just as important in this field that I am briefly dealing with. And so, therefore, I would have you think of the members of your local Medical Society as your legitimate representatives, not elected in the ordinary course of affairs, but, after all, elected in a sense, for are they not licensed in accordance with laws which you have helped put upon the statute books? And, therefore, their qualifications are as high or as low as you insist upon. I plead, therefore, at this point for intelligent and informed coöperation with your Medical Society in the interest of public health.

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[2] These figures are taken from Statistical Bulletin, Metropolitan Life Insurance Company, March, 1936, **17**, No. 3.

[3] Robinson, V.: The Story of Medicine. New York, Boni, 1931, p. 446.

But even when this is done the story is not finished, by any means. The scientific facts, as I say, have finally to be passed upon and accepted, but their acceptance by just the scientific men and a few members of the Medical Society is not sufficient. Behring had already started the treatment of diphtheria with antitoxin when my teacher died of that disease. The spread of the knowledge of such a great achievement and its understanding has to be engineered. The public needs to know about it as well as the physician, and they need to feel faith and confidence in it as much as they need to lack faith and confidence in the advertisements of the charlatan. All this is work which comes under the head of publicity, or propaganda, as you will, but it is very important. If you wish an illustration, let me refer to vaccination for smallpox. It is now 140 years since it was first performed by Edward Jenner, and in spite of the fact that it has all but rid the world of this dread epidemic disease it still encounters organized resistance. So you will see that it is largely the job of the men who make up your medical societies to translate to the public discoveries which are of value, to warn the public against those alleged cures which are of no value or are really harmful, to develop leadership in this whole field which will support adequate programs of public health, to be enforced by the public health authorities and which will properly translate all of these things into necessary educational procedures, legislation, and in general their application in the actual care and prevention of disease.

If illustrations of these principles are needed, we have not far to look. I find them right here in our own community. The Medical Economic Security Administration for the District of Columbia was put into operation by the coöperation of the hospitals, the Community Chest, the medical and dental societies and various public health organizations. It consists of the Central Admitting Bureau for Hospitals, the Medical-Dental Service Bureau and the Permit Bureau of the Board of Public Welfare. This project undertakes to arrange not only that every applicant who is unable to pay the full costs of his medical care shall receive treatment under financial arrangements adjusted to his capacity, but that if an applicant is unable to pay anything at all he may through application to the Permit Bureau of the Board of Public Welfare be taken care of free of expense at the Gallinger Municipal Hospital.

This organization has taken care of the mutual relations between doctor and patient during these serious years of depression and has been so successful as to attract the attention of the municipalities throughout the United States. You know the principles upon which this arrangement is based, namely, that the person of moderate means needing medical or dental care can apply to the Medical-Dental Service Bureau and they will make an arrangement with his physician in accordance with his ability to pay; and the arrangement being satisfactory to the patient, he arranges his affairs to meet his obligations on a partial-payment plan, and the Bureau undertakes to see that this is carried out so that both patient and physician meet upon a common ground of mutual understanding and confidence, which is eminently helpful to both. Then there is the admirable work being done by the Group Hospitalization organization, which is interested primarily in the patient who is neither indigent and, therefore, taken care of by the public, nor wealthy and, therefore, independent, the patient who falls between these extremes and who has always suffered most when illness has come upon him or invaded his family. This organization, as you know, has set up a scheme by which groups may join, and on the payment of a very moderate monthly sum each individual of the group is assured, if necessary, as many as 21 days' hospitalization in case of illness. This scheme has been of inestimable value in the short time in which it has been in existence.

And, finally, I can not refrain from mentioning the splendid work done not only by all these organizations but by the Community Chest of Washington, which has many types of organizations other than medical to help support and which is able to secure the services of the leading men in the community—lawyers, doctors, administrators, laymen—and many women as well, who in the administering of all of these institutions created for public service, the alleviation of suffering and human betterment, give their services freely and generously. It is an inspiration to be associated with these groups in their various organizations and to realize how generous and how responsive the citizenry of the District of Columbia is to such needs. These all represent excursions into the field of medical statesmanship, and, I truly believe, representations of what we may expect to see very much more highly developed in the next few years.

These facts, as I have set them forth, regarding the public health, seem to me to be obvious, and I feel that probably all of you will acknowledge their substantial correctness. I have only undertaken to put together the various facts as I have stated them and to make up a picture as a result which would render somewhat clearer what in its various parts I have no doubt you all agree with, and would emphasize more particularly the relation of these parts one to another and integrate them into a comprehensive, meaningful whole. I might repeat what I have already said and in a few words sum up the significance of the matter I have thus far presented by saying that it would seem that the net result of our conclusions could be very well expressed by saying that no great municipality such as we are accustomed to consider as part and parcel of our social and industrial organization of today—no great municipality, I say, such as Washington, New York, Chicago, San Francisco, could exist without the maintenance as part of its administrative system of those health agencies and institutions which have been stamped into the culture of our times and have become a part of its essential structure.

Now, of course, this audience would not expect me to close on this note. I am sure you would be, if not disappointed, at least surprised, if I failed to say something about mental health; and I myself would feel, if I were so delinquent, that the capstone of the structure which I have been building up for you had been left off. I will, therefore, with your permission, occupy a few moments with what, after all, I consider the most important aspect of public health. A healthy body, laved and clothed and housed and fed, even free from the possibility of contagious and infectious disease, would be of very little use if it were not the instrument of a mind animated and activated by constructive, socially worth while motives. I could take you back over the historical facts in some such brief way as I have with reference to the questions of bodily health and call your attention to the things that have happened in the past and from which we are free at present just as we are free from epidemic disease, namely, so long as we remain eternally vigilant to dangers that we now know of. If we go back to the Middle Ages, which, after all, is not so long ago, at the time to which I referred before in discussing physical diseases, you will recall that not only were people living under conditions of great physical distress but also of great mental distress, that the feudal barons of the time, who occupied their castles surrounded by moats, were lords of all they surveyed and their will was law. They even employed their private executioners and torturers. Even later on in history it was not an uncommon sight for executions to take place in the public squares of large cities, and some of these executions were of the most brutal kind—breaking on the wheel, drawing and quartering, flaying alive, and all such hideous things that are almost too terrible to contemplate today. Just as I have said with reference to physical disease that we would be exceedingly foolish if we thought that after we had once obtained freedom from epidemics we could afford to relax our vigilance, so in this realm we would be living in a fool's paradise if we believed that because for the time being such manifestations as these are no longer possible that changed circumstances and conditions might not result in their recurrence. Man, so far as we know, has not changed materially in his fundamental nature, at least during historic times; and if he is a better behaved, better socialized creature than he was 300 years ago it is only because what we are pleased to call the "veneer of civilization" has been sufficiently powerful to keep him to a somewhat different line of conduct than he had known in the past.

Let, however, these restraints be relaxed, let the patterns of culture in this respect disintegrate, let the institutions which maintain them lose their hold of the people, and it is as conceivable as it would be in the case of physical disease that a like relaxation of public health activities would result in epidemics, that here a similar breakdown of controlling and restraining influences would lead to similar results in man's behavior. Here again it is obvious that it is with the greatest difficulty that man overcomes his selfishness, his greed, his cruelty, and is able to build up the institutions of civilization and culture and live together at peace with his fellow man. It is much easier to take the path of least resistance and give way to the dictates of primitive impulses and to tear down what has been so laboriously constructed. If the slum districts of great cities are the centers of bodily disease, they are equally the centers of moral disease and mental disease, of crime and delinquency of all kinds and descriptions. And so it becomes as necessary for man to know himself in the sense that he understands the potentialities of his nature, as it is that he should have identified the causes of disease and have studied the means of its transmission and developed technics for its eradication and prevention.

Let us pause for a minute and consider what this means. Man in his primitive instincts is selfish and cruel. He has to be selfish and he has to be cruel. The new-born babe's interest is 100 per cent in its own nourishment. Its horizon of interest has not extended at first beyond those limits. The new-born man faces not only the question of nourishment but of competition for that nourishment from other men and from beasts infinitely superior to him in physical power. In his competition for food and for a mate, strength, ruthlessness, and, later, cunning, were the means of his success. And today, many thousands of years after the appearance of the Dawn Man, these means are still largely in use and still highly thought of, albeit somewhat refined in their outward appearances and in the specific uses to which they are put. But, if I may bring another analogy from the realm of physical disease for the purposes of illustration, may I remind you that the armies of the past as they have marched to conquest have not infrequently been destroyed or so fearfully decimated by disease that they were useless as fighting forces. It is as if they had purposely released the germs of deadly disease as weapons of warfare and were in turn destroyed by these same weapons. In fact, this is really what happened, although of course the germs of deadly disease were not voluntarily accumulated and intentionally set free, because these armies knew nothing of germs; but, so surely as armies congregated, so surely as they marched across the land, they carried with them the possibilities of epidemic disease, and their ignorance of sanitation and public health measures as we know them today made these results inevitable. How frequently have we not seen in the annals of history the victor destroyed as well as the vanquished? Who was it that said, "One more victory like this and we are ruined"? Some General, I have no doubt. These results, however, were blamed upon external factors. The disease that produced such results was not considered to be one of the natural outcomes that could be expected to result from war. It was something that was beyond the control of man; something, perhaps, that the Gods knew about, but certainly nothing that man could do anything about. How closely analogous, if "analogy" is the correct word, are such events with those that we see today. The results of war, manifesting themselves in innumerable directions, building up hates, antagonisms, jealousies which masquerade under the names of patriotism, nationalism, self-protection, race superiority, justice, and a thousand and one disguises which are used for all sorts of purposes.

It is a part of the strategy of hiding that the place of concealment should be chosen with a view to its inconspicuousness, that it should be the last place where anyone would expect to find that which is hidden. So, just as the malarial plasmodium sought out the apparently harmless insect, the mosquito, as an appropriate hiding place, so do these aggressive and destructive tendencies of man hide behind such symbols as I have named, which it would appear to be a sacrilege to suspect of harboring such guests. Is it not apparent that it is as essential to know the true motives that animate men and nations as it is to know the pathogenic micro-organisms that produce the diseases? Is it not apparent that it is just as important to know the names under which these motives masquerade as it is to know the carriers of these pathogenic micro-organisms? Is it not apparent that it is just as essential to know the mechanisms by which these disguised motives operate as it is to know the life history of disease carriers? General Gorgas in his campaign against yellow fever in Panama freed this region from this disease, which had afflicted it for hundreds of years. Can we not vision a General Gorgas of the future in some new Geneva unmasking the motives of some international demagogue, and having history record that this is the first time that nations have been free from the danger of the unknown disguises of the cruel and selfish motives of their representatives, for thousands of years? To look forward to such tasks may be perhaps discouraging. We become more easily optimistic as we look over the accomplishments of the past. These accomplishments have been tremendous, entirely and utterly incomprehensible by those who lived only a few generations ago. The gigantic undertakings that brought them about could hardly have been even conceived. Man was thought to be too much at the mercy of the forces that surrounded him to make any such conquering of them as we have seen in the last generation even conceivable. The task for the future looks even more difficult, yes, a thousand times more difficult than the task of the past as we view it in retrospect. It is as if we might expect the graceful bodies and the radiant faces of youth to lose their attractiveness, and the germ plasm of their loins to take its place. Hardly anything would seem to be more impossible, and yet man is the arch worker of miracles, and if through the ages he had not been able to negotiate the impossible he would have long since ceased to be.

This is putting what I conceive to be a tremendously important matter in very few words, and I, therefore, feel very strongly that I am running no small risk of not being understood, and so I will endeavor to draw certain other analogies and give additional illustrations which will help make my meaning clear. As I have already indicated, the impetus that led to the study of contagious, infectious and epidemic diseases came from the work of Pasteur, who laid a firm scientific foundation for the understanding of these diseases on the basis of their causation by disease-producing micro-organisms, or, as they are generally called, pathogenic bacteria, and for a long time all disease tended to be thought of in this way. But, while we know now that many diseases are not so produced, we do know that this theory is in general true of the great scourges of mankind, such as I have been discussing. Following Pasteur, progress was extremely rapid, and the principles of preventive medicine and sanitation developed sufficiently, so that today we are free from all the major scourges except perhaps the venereal diseases, and even these diseases are easily preventable on paper. The difficulty is not either in knowing the causes or in knowing how to destroy the causative agents. The difficulty is of a different sort, which, however, this is not the time nor the place to discuss. Notwithstanding the fact, however, that we are comparatively free from the great disasters that swept the world during the Middle Ages, we are only free because of continuous and unremitting vigilance. The causative factors of these diseases are not dead nor destroyed. They are ready at the first breach that is made in our defenses to overwhelm us again. Now, I might use almost the same sort of language with reference to the destructive agents in modern civilization which are of psychological rather than bacteriological origin. The aggressive and the destructive instincts of man are held in abeyance by the customs, the traditions, the social, moral and religious standards of civilization, and, like the disease-producing organisms, they are held in abeyance so long as we are eternally vigilant in the care of our defenses. They have never been rendered inactive and harmless. In fact, they continue to provide the fundamental springs of energy which keep the human machine going. What the institutions of civilization have done is to see that the energy which they discharge is discharged in certain acceptable channels. Now, precisely as in the case of physical disease, anything that impairs the structures which have been erected to guide the discharges of energy from these sources, the defenses which we have set up to protect us from our own destructive and aggressive tendencies, may, if our vigilance is withdrawn, cause a breakdown of these defenses, and at the first break they, just like the micro-organisms of disease, will rush through the breach and destroy us. Can anyone have any reasonable doubt that this is so when he has only recently lived through a world conflagration that cost 40,000,000 lives? And can he have any doubt that the animating forces that started that conflagration, that kept it going, that continued for 4 years to direct man's energy from one end of the world to the other into avenues of aggression and destruction, were of psychological origin? We have the ways and the means within our knowledge and control to protect ourselves from great epidemic scourges, but we have never yet consciously, intelligently and scientifically undertaken to protect ourselves from the disasters that may emanate from these other sources. And that, as I see it, is not only the problem of the future but it is the challenge with which our beginning knowledge of these forces confronts us; and if we can judge at all by the present state of affairs as we try to understand the world as it presents itself to us today, this challenge cannot be too quickly accepted. We have had our Pasteur and we have had our Gorgas; in the former instance a man who pursued his studies and experiments and investigations under every conceivable handicap and against the opinion of authority in every direction until his work came to successful fruition; in the second instance a man who was equipped with the necessary knowledge and in addition had the capacity, the character traits, the ability, that made it possible for him to put that knowledge to use to accomplish the results which its possession made possible. At the present time I do not know, and I do not believe anybody knows, whether we have sufficient knowledge to start upon a program of this sort with any expectation of success. I do know that we have developed during the present century new ideologies and methodologies in this field and have also developed an enormous accumulation of factual material. What we need is someone in whom all of those qualities are so effectively integrated that he will be enabled to see the importance and significance of the facts and how to utilize them in an effective way to produce the results which naturally flow from their operation. In the past in some magic way the times seem to have developed such personalities when they were needed. Perhaps that will be the history of the present instance, but in the meantime let me repeat what I have already said with reference to physical disease, that your Medical Society is, by and large, the best organization that you have from which you may expect constructive results in these various directions. You may have thought as I have spoken in these last few sentences that I look to psychology for the future solution of these more immediate problems. I do not claim to be a prophet and I have no idea whence the solution will come. It may in fact be from the psychologist; but, up to the present writing, such material and information as we have gained along these lines have come primarily from the physician. It has been the sick patient who has disclosed the workings of his mind as well as his body who first attracted attention and has made the understanding of mankind, mental and physical, possible; and the group of men who devote their lives to dealing with the sick patient is the physicians.

Neither the business man, the banker nor the clergyman is equipped with adequate knowledge and experience in the realm of natural law, as it expresses itself in the domain of science, to handle these problems; whereas, the astronomer, the physicist and the chemist, who deal at firsthand with these forces, have not the personal contact and the understanding of human beings sufficient. And so the physician has stood midway through the ages as the interpreter of these scientific laws and facts, and the protector of the health of the body and the sanity of the mind. That is his natural place; and if you demand of your Medical Society service in accordance with such specifications I am sure you will get it.

The Medical Society of the District of Columbia in the 119 years of its existence has had a distinguished membership. It would be easy to cite their names at this point except for the fact that it would be difficult to know where to stop. At the present time the membership of the Society is a distinguished one and one that the District of Columbia may well be proud of, and, therefore, I feel that I can make this recommendation with complete confidence: That there should be an alliance between the citizenry of the District of Columbia and the Medical Society whereby an enlightened public opinion will seek scientific and professional leadership. This alliance has already begun to take form during these years of the depression, as I have already indicated. I trust that it will continue to grow and to prosper and to have an honorable career, and to be a credit and a joy to both of its parents.

Postmortem Findings in Fatalities Due to the Use of the Arsphenamine Group. A Review of 44 Autopsies.—The discovery of "606" by Ehrlich in 1910 ushered in a new era in the treatment of syphilis. Along with this new and superior therapeutic agent came new ideas and hopes for the cure of this disease. Also new problems were introduced in pharmacology and toxicology. Today, more than 25 years later, much remains to be learned of the toxicology of the arsphenamines. The clinical signs of toxicity are fairly well understood, but no one can predict which patients will experience untoward symptoms nor is there agreement as to the exact mechanism of the toxic action of the organic arsenicals.

So far as can be determined by a reasonably careful search of the Navy records, there were 63 deaths chargeable to the arsphenamines during the 17-year period 1919–1935. There were 44 autopsies.

In the belief that a better understanding of the action of these drugs may be gained by a study of the lesions found at autopsy, this article is devoted to a review of the postmortem findings in the 44 autopsies. . . .

Age, sex and race.—The youngest man was 19 years of age, the oldest was 43, and 29 of the 44 were under 30. All of them were males. Cases 3, 36 and 37 were Filipinos, case 40 was a Hawaiian, case 19 was a Negro, and the remaining 39 were white.

Duration of infection.—All of the patients had syphilis, the duration of which was unknown in 6 instances. Of the remaining 38, in 21 it was less than 6 months; in 1, between 6 months and 1 year; in 4, between 1 and 3 years; in 2, between 3 and 5 years; and in 10, over 5 years.

Interval between final injection and onset of symptoms.—In 6 instances the interval could not be accurately determined, because symptoms developed gradually and did not attract attention until well advanced. In the remaining 38, symptoms appeared in 7 instances in 5 minutes or less; in 11, in less than 6 hours; in 11, between 6 and 48 hours; and in the remaining 9 the interval varied from 3 days to 29 days.

Previous treatment.—The type of arsenical given at the final injection was in 34 instances neoarsphenamine; in 5, salvarsan; in 2, arsenobenzol; in 2, arsphenamine; and in 1 the type was not stated. This is not to be interpreted as an indication of greater toxicity of neoarsphenamine; this arsenical is the one most extensively used in the Navy.

Postmortem findings.—The striking features are the frequency of edema, congestion, and hemorrhages in the different organs. This is not surprising when one recalls that one of the effects of arsenic is to cause dilatation of the capillaries with increased permeability. An additional effect is attributed to the drug by many authorities, namely, damage to the endothelial lining of the capillaries. If this action extends to the reticulo-endothelial system, one has a basis for nearly all the manifestations of arsenic poisoning. It is obvious that these factors will produce marked variations in symptomatology and pathology, depending on the location and amount of edema and hemorrhage.

One of the most common and least serious reactions which follows the administration of the arsphenamines is the so-called nitritoid phenomenon. This has been attributed by Kolmer and others to a vasodilatation or vasoparesis. One of the reasons for this belief is the prompt relief which usually follows the injection of a vasoconstrictor such as adrenalin.

Probably the most severe reactions are those usually diagnosed as hemorrhagic encephalitis. In these there is the factor of edema, which causes increased intracranial pressure and the symptoms familiar to all, and the other factor of hemorrhage into vital centers. The characteristic pathologic picture is a wet brain with multiple punctate hemorrhages. . . .

SUMMARY: In the 17-year period, 1919–1935, there were 63 deaths in the United States Navy following the administration of the arsphenamines. All of the 44 autopsies were made on males, none of whom was over 43 years of age. In this group were 3 Filipinos, 1 Hawaiian, i Negro, and 39 whites. All of the patients had syphilis. The duration of infection is known in 38 instances. In 21, or 55 per cent, it was less than 6 months, and in 17, or 45 per cent, over 6 months. The time interval between the final injection and onset of symptoms was less than 6 hours in 18 cases, over 6 hours in 20 cases, and unknown in 6 cases. Neoarsphenamine caused the largest number (34) of the deaths, which was to be expected, as this is the arsenical most extensively used in the Navy. None of the patients died after the first injection of an arsenical; 12 died after the second; 23 after 5 injections or less; and 20 had received more than 6 injections. In one instance the number is not known. Autopsies were performed on 44 cases, the results of which are presented and discussed. The striking findings were frequent hemorrhages and edema in the various organs of the body. The autopsy findings are suggestive of a common pathologic basis for many of the clinical manifestations.

Extract from article by S. S. COOK, Commander, Medical Corps, United States Navy, *Public Health Reports, July 10, 1936, p. 927.*

CLINICAL OBSERVATIONS ON GLOMERULONEPHRITIS*

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In any short talk on a very broad subject the speaker has a choice of three plans:

1. He may report a special bit of research;
2. He may review all that is known on a part of the subject;
3. He may place the spotlight of his experience briefly on many parts of the subject.

This last plan, which I am going to follow, by its sketchy character discounts the speaker's ability to present his material gracefully and pleasingly. But the audiences at state and district meetings are predominantly men in general practice, and I have been informed that this is true here. Experience has taught me that what the practitioner wants is useful practical information even though its presentation may be somewhat graceless.

So, with apologies for the thin continuity of my remarks and without further introduction I shall plunge directly into my subject and present to you some clinical observations on glomerulonephritis.

Little has been added of late to our knowledge of the causation and mechanism of glomerulonephritis. The streptococcus is still the most frequent though not the exclusive offender. That vague term "anaphylaxis" seems to offer the most plausible explanation of how the toxic agent acts within and outside the kidney. The exact mechanism is most dubious. Volhard's theory of a primary general and local angiospasm with subsequent inflammation in the glomeruli, etc., is the most plausible explanation. At present our deficiencies in this field are of no great practical moment.

Of considerable practical importance, however, at least from the point of view of prognosis are (1) the type of onset and (2) the duration of the initial acute stage. It seems to me that those patients in whom the onset is insidious without discoverable etiology are most liable to become chronic nephritics. Perhaps they are already latent and chronic when first recognized. And the second point—the degree of severity of the acute stage—you know is not at all helpful in determining the question of chronicity, but the prolongation of this active stage for weeks or months certainly points to a probable lack of cure.

Albuminuria is a very commonplace subject but I am sure most of us can get more out of it than we do. When a urine "boils solid," as we say, that is very impressive, but I do not need to remind you that this may occur in the very mildly ill nephrotic patient or that digitalis may dispel the greater part of it when it is due to passive congestion. By contrast, your critically ill uremic may disclose only minimum amounts of albumin.

Do not misunderstand me. The large loss of protein in the urine has no doubt considerable potential seriousness in that it may bring about a lowering of the serum proteins and with this, the edema of the nephrotic stage of this disease. In this connection, may I warn you of the patient with subacute hemorrhagic nephritis who appears to be getting well in every respect except that he continues to excrete a considerable amount of albumin in his urine. Such a patient after a few weeks may slip into this same nephrotic stage with edema. Early recognition of this possibility should point to the desirability of giving a compensatory high protein ration. Incidentally, this high protein diet is not always as effective as we would expect, and only recently have we found out part of the reason. It has been discovered that in true nephrosis at least, the albumin in the urine is not normal serum albumin at all but one with an entirely different nitrogen-sulphur ratio. Somewhere in the patient's protein metabolism there has developed a perversion. And the final point about albuminuria is that a patient with albuminuria of more than 1 or 2 years' duration never gets a cure, although he may live for many years.

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* Read before the Annual Scientific Assembly of the Society, May 7, 1936.

In this brief paper nothing more can be said on the subject of edema than to remind you that in acute glomerulonephritis the edema is not mere retention of water by the kidneys but is the result of a direct toxic poisoning of the capillaries in the various parts of the body affected. Sodium and water restriction, for a time, is its effective therapy. In the nephrotic stage the mechanism of the edema is not so clear. Great protein loss through the urine brings about a lowering of the blood proteins, a reduction of the osmotic pressure in the blood and consequent edema, ascites, etc. If this were all, then high protein feeding should act as it does in protein starvation, and, by replacement of loss, restore osmotic tension in the blood and dispel the edema. A perversion of the protein metabolism, as yet not fully understood, explains our frequent failures and our need for relying on other means to get rid of the excess of fluid. It is in this type of nephropathy that the diuretics act best. Salyrgan has been our sheet anchor up to now, but the new mercurial suppository, Mercurin, threatens soon to supplant it.

In the last few months of life a third type of edema is present which is predominantly cardiac. It should be treated as such with digitalis. Because of marked renal insufficiency at this time other methods of treating this failing heart such as diuretics and restriction of fluid are not desirable or safe. It is not always easy at this stage to choose the right treatment. A recent very disturbing experience of mine illustrates the delicacy of the cardiovascular-renal balance and our difficulties in maintaining it. A hypertensive nephritic with what seemed to be only moderate renal insufficiency entered the hospital and was placed by me on a modified Karell diet with limited fluids because of beginning congestive heart failure. While the heart improved as a result of this therapy, renal failure increased with great rapidity, and in spite of our efforts to correct this by clyses, etc., he died in uremia in a very few days. Somewhat more common is the cardiac failure that results from the overenthusiastic treatment of the kidneys by forcing fluids beyond optimum limits. Three of our hospital patients recently were pushed into a fatal pulmonary edema in this way. One must be extremely careful of the renal and cardiac balance in these terminal nephritics. We must remember that our problems are not renal alone but rather cardiovascular-renal.

There is but little that is new on the heart in glomerulonephritis. In the chronic stage we are merely dealing with the ordinary hypertensive heart. Richter and I have, however, found a 48 per cent incidence of pericarditis in this disease, which is very much higher than has previously been reported. The duration of life in our patients after the appearance of this ominous sign averaged only 7 days. Our studies also led us to believe that the cardiac abnormalities found in these patients by Wood and White and attributed by them to the uremic poison are probably more correctly attributed to the terminal pericarditis.

There are but two facts worthy of mention on the subject of hypertension. The cause of the increased blood pressure in glomerulonephritis is still uncertain, but it is probably a direct stimulation of the vessel walls themselves by a chemical substance (not adrenalin), possibly derived from or retained by the kidney, and bringing about hypertonus without nerve action. The second fact cannot be too emphatically stated. As yet there is no specific effective and safe therapy, either medical or surgical, for hypertension, be it renal or vascular.

Among our hypertensive patients we are beginning to appreciate the occurrence of a somewhat unusual type of glomerulonephritis exemplified to an extreme degree by one of my clinic patients. He is 65 years old and for 12 years under our observation has presented a typical picture of vascular hypertension. He has shown high blood pressure, albuminuria, a "hypertensive heart" and lately auricular fibrillation, but there has been no renal insufficiency and no anemia. However, note this—our patient's history dates back to an attack of acute glomerulonephritis just 27 years ago. Such a patient is a bit of a puzzle unless we assume, as we can in other less chronic cases, that a vascular lesion was initiated which outstripped his renal lesion. This again serves to remind us that glomerulonephritis is far more than just a disease of the kidneys.

We have long since given up the term "albuminuric retinitis." In our clinic we believe that the terms "renal" and "hypertensive retinitis" should also be given up. Cannady and I, 2 years ago, concluded that the retinopathies of glomerulonephritis, vascular hypertension and the so-called "malignant hypertension" were essentially only variants of the same vascular process. Incidentally, these same studies on our glomerulonephritic patients indicated a maximum length of life after the appearance of these advanced retinopathies of 23 months; the average was only 6.3 months.

Knowledge of the anemia of chronic nephritis is most unsatisfactory. What causes it we do not know. Certainly the hematuria is not responsible. One may postulate an unknown toxin produced or retained by the damaged kidneys and causing hemolysis of the red cells. As a matter of fact, Dr. Pijoan is showing that the red cells of the nephritic patient are more resistant to hemolysis than normal cells or the cells of pernicious anemia and other anemias. We may postulate an ischemia of the bone marrow similar to that of the kidneys and other organs. The fact remains—we do not know the cause.

The treatment of this anemia is equally unsatisfactory and discouraging. We have tried iron in all forms and in all ways. We have injected liver and we have transfused. The blood count may rise after transfusion, but the effect is usually of short duration. I have failed to see any very satisfactory results from any of these methods. The only favorable response has been from the administration of an adequate diet in those individuals who have been treated too enthusiastically and too long with a low protein ration. Experience has taught us that a diet of 28 to 40 grams of protein, while justified occasionally for short periods, is a pretty poor one to give a patient for long. It may rest the kidneys. Actually, however, it is so deficient in iron, calcium and phosphorus that it never should be used unless for a very specific purpose and for a very limited time. One should strive to give one's patient approximately 1 gram of protein per kilogram of body weight. Anything less than 60 grams is deficient in essential minerals.

The tests of renal function are at times extremely helpful, but no one of experience will admit that they are anything but adjuncts to our basic clinical knowledge. Far too often while consulting in small hospitals I have had offered to me the blood "N. P. N." (nonprotein nitrogen) as a substitute for practically all other findings. The duration of the illness, aggravation of the chronic process by acute infection, the condition of the heart, etc., all are ignored or forgotten in the pride of "keeping up-to-date" with an "N. P. N."

As a matter of fact, the physician without access to a chemical laboratory can do a very good job in handling his chronic nephritic patient, if he knows his patient and knows the history of the disease. Specific gravities in the 1.020's indicate that no great renal failure has as yet occurred. The maximum specific gravity under real stress is a pretty good index of renal function. A low specific gravity by itself is of no value. The degree of anemia is not too bad an index of this function in the chronic stage, although it may occasionally fool one. An ammoniacal odor to the breath should tell the doctor at once that well-marked renal insufficiency is present. The "large renal failure casts" are an additional evidence of uremia.

To the intelligent physician who has access to a reliable laboratory very valuable help is available in the various function tests, a quick appraisal of which I will now offer.

The urea clearance test is most helpful in indicating early renal failure before the simple "B. U. N." (blood urea nitrogen) shows such. Technical features, however, confine its use to well-equipped laboratories. Late in this disease, too, its value is less than that of the "B. U. N." Other "clearance" tests, such as the creatinine, xylose, etc., are still in the experimental stage or useful chiefly for research purposes.

The phthalein test, though rather crude and subject at times to unaccountable error, is easily done and is not too bad a test of the general level of renal excretion if done correctly. It is of greatest use when done in conjunction with the blood chemistry.

The most generally useful test of renal function for the practitioner with access to a laboratory is the simple "B. U. N." (or "N. P. N."), because it is the most helpful when he needs help most, i.e., in the unconscious patient and while following the course of the patient with renal decompensation. In the former the "B. U. N." may be diagnostic. In the latter the rate of progress of the disease and the response to dietetic therapy is evident.

Let me repeat, however, what I said above, that the intelligent physician should be able to care for his chronic nephritic patient without any of these tests. They never should be allowed to dominate his action when intelligent clinical judgment points in another direction.

Renal function naturally brings to mind renal failure and this in turn uremia. It is quite enough for this short paper to say that uremia is not a single entity and certainly not all renal in origin. In this syndrome rôles are played by toxins retained and perhaps manufactured by the diseased kidneys, toxins derived from the intestinal tract, by acidosis and by anemia, by arteriosclerosis and edema of the brain, etc. Some of these elements can be properly assessed, more of them cannot. It is well to remember that dyspnea at this stage may be cardiac, that Cheyne-Stokes breathing may represent merely a failing cerebral circulation, that the headache may be wholly or partially due to the hypertension, and that the vomiting may be due in part at least to the compensatory excretion of urea and ammonia into the mouth, stomach and duodenum.

Furthermore, while the eventual outcome in the chronic case is certain it should be borne in mind that a few patients may carry on in the latent stage for months or even years in fair health. Remember too, that while we cannot restore these patients to health we often can do much to keep them comfortable by an intelligent understanding of the whole problem, by an intelligent regulation of the diet and fluid intake and by common sense symptomatic therapy. Over-enthusiastic treatment of the renal failure by forcing fluids may bring about cardiac failure and a fatal pulmonary edema. On the other hand, too great restriction of fluids may increase renal failure. These patients are serious and difficult problems in cardiac, circulatory and renal balance.

Pseudo-uremia or hypertensive encephalopathy deserves a word. It may occur early in glomerulonephritis even before renal failure has commenced. This cerebral disorder due probably to cerebral vasospasm is associated with a rapid rise in blood pressure. If recognized it responds well to treatment with morphine, bleeding, and intramuscular or intravenous magnesium sulphate.

In concluding, let me say that in the handling of our nephritic patients one can and should utilize intelligently the great legacy of knowledge derived from Bright and those who have followed in his footsteps. Much can be done if one has a thorough understanding of three things: (1) The patient himself, (2) the history of his disease with its variations, and (3) the tools he has to work with.

Acute Appendicitis and Measles.—During a 5-year period one of us (H. W. H., Jr.) has observed 8 cases of acute appendicitis during the course of measles. This unique experience has led us to review the literature and to record our own findings, in order that attention may be called to a curious clinical picture. . ..

Discussion.—Analysis of the cases reported . . . brings out the fact that the symptoms and signs pointing to appendicitis bear a close time relationship to the prodromal and eruption stages of measles. Thus, in cases 1, 2 and 3, the appearance of the exanthem and a complaint of abdominal pain were noted on the same day. In case 7, acute appendicitis occurred on the first day of illness and 3 days before the rash was noted. In the remaining cases, 4, 5, 6 and 8, the onset of abdominal symptoms was 4, 2, 4 and 7 days, respectively, after the eruption was noted. In 2 of these 4 the clinical histories were less reliable than in the others and it is at least possible that the onset of appendiceal inflammation coincided more closely with the rash than appears from the records. . . .

Conclusions.—To the 31 instances of measles and appendicitis reported in the literature 9 are added. From this experience and the review of the literature, the conclusion is reached that there is an intimate relationship between the two diseases. Regardless of whether measles is an etiologic factor in the development of appendicitis, it is established that the two may coexist. In the presence of measles a thorough abdominal examination is indicated, together with careful appraisal of the symptoms of abdominal pain and vomiting which are frequently present. If the signs of appendicitis are demonstrated, operation is indicated despite the presence of measles.

Extract from article by HENRY W. HUDSON, JR., M.D., AND CECIL KRAKOWER, M.D., Boston, *New England Journal of Medicine, July 9, 1936, p. 59.*

THE ETIOLOGY OF RHEUMATOID (ATROPHIC) ARTHRITIS*

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One of the important factors in the care of patients with any chronic disease is the satisfactory understanding of its etiology. There are many theories as to the cause of chronic arthritis; it is worth while from time to time to survey critically the accumulated information. I wish to consider various hypotheses which are proposed as the cause of chronic rheumatoid arthritis. It will be wise to limit the discussion to the main views regarding the pathogenesis of this disease of the joints.

The present confusion arising from the multiplicity of terms used is a result of a lack of clear understanding and interpretation of the factors causing diseases of the joints. The looseness with which these terms are employed has led to further misunderstanding. Likewise, the tendency to draw conclusions as to the etiology of the disease on the bases of results of various therapeutic measures frequently gives rise to error. Another serious cause of confusion arises from the failure to discriminate between clinical features which are primary and those which contribute to the symptomatology of the disorder.

The term rheumatoid arthritis is used synonymously with atrophic and with chronic nonspecific infectious arthritis. Pathologically, the process is spoken of as proliferative arthritis. Rheumatoid arthritis is a disease which is primary in the synovial membranes and the periarticular tissues. Secondarily, there may be destruction of cartilage, atrophy of bone, new bone formation, subluxation, fibrous or bony ankylosis and muscular atrophy. Any theory which attempts to explain rheumatoid arthritis must account for the essential and characteristic lesions of the disease, that is, synovitis and periarticular tissue changes. Again those factors which are secondary and contributory are to be recognized and considered as such.

For our purpose three main theories deserve consideration. They are, first, the unitarian; second, the so-called "eclectic"; and third, the infectious theory.

The proponents of the unitarian theory consider both rheumatoid and degenerative (hypertrophic, osteo-) arthritis to be of the same etiology.

The eclectic theory is more or less sponsored by the American Committee for the Control of Rheumatism. This theory is a complicated and, to me, somewhat vague attempt to explain this poorly understood disease.

The infectious theory has received the greatest attention in this country. The proponents of this theory are divided into three main groups: (1) Those who believe that the articular process is a true metastatic lesion from a focus of infection; (2) those who consider the disease to be the result of "toxins" absorbed from a focus of infection; and (3) those who consider the disease to be allergic, i.e., a reaction of sensitized tissue to bacteria or bacterial products.

It will be well to consider, briefly, the arguments for these theories and to ask to what extent they may be justified in the light of our present knowledge.

The unitarian theory presupposes that both rheumatoid and degenerative arthritis are due to the same etiological agent or agents and that the factors which determine the type of lesion seen are secondary, such as trauma, foci of infection, the involutional changes of the menopause, and the habitus of the patient. It seems that the reasons for such a theory are dependent upon the observation that many patients show pathological joint changes which have the characteristic lesions of both types. This has given rise to the so-called term "mixed arthritis." These findings should not be surprising. The occurrence of pathological lesions characteristic of both types of arthritis can be readily understood without recourse to the explanation that both are caused by the same factors. When the incidence of degenerative changes in the joints is studied, it is found that the lesions increase in frequency and severity with advancing age (Keefer, Parker, Myers and Irwin). In individuals over 40 years of age it is unusual to find joints which are absolutely normal. If a patient with degenerative changes in the joints develops rheumatoid arthritis, then the lesions of both types will naturally be present. No one can mistake the characteristic pathological lesions of one type of arthritis for the other. The course of events in the development of the two types of joint diseases is quite different. It hardly seems reasonable to accept the unitarian theory of the origin of rheumatoid and degenerative arthritis.

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* Read before the Section on Internal Medicine of the Society, February 28, 1936.

The proponents of the eclectic theory rely upon such terms as "imbalance" and "dysfunction" of the nervous system, the gastro-intestinal system, and the peripheral vascular system. The vagueness with which it has been explained that this "imbalance" operates makes it difficult to examine critically the claims of the proponents of this theory. One would like to know just how such "dysfunction" produces chronic inflammatory changes in the synovial membranes and the periarticular tissues. It might be worth while to examine briefly the suggested "dysfunctions" without attempting to understand the mechanism whereby these "dysfunctions" act.

In the gastro-intestinal system gastric anacidity, atonic dilatation of the colon and carbohydrate indigestion are frequently ascribed etiological significance. Bloomfield and Keefer, and again Miller and Smith, as far back as 1926 pointed out that gastric anacidity occurred no more frequently in patients with chronic arthritis of any sort than in a control group of patients of comparable ages. The question of colonic abnormalities has been carefully reviewed with adequate series of controls by such workers as Bauer, Archer, Nissen, and Haft, all of whom found that whatever abnormalities are present are in no way related to rheumatoid arthritis unless as a result of prolonged illness. The changes were found to appear and progress with chronic illness and were associated with the lack of exercise. It is important to note that these colonic abnormalities were neither caused nor influenced by diet. Carbohydrate indigestion is by no means limited to patients with chronic arthritis. When carbohydrate indigestion is found in patients with chronic arthritis it is usually seen to follow, rather than precede, the arthritis. It is difficult to conceive how gastric anacidity, atony of the colon, or carbohydrate indigestion can play a rôle in causing rheumatoid arthritis.

The possible relationship between disturbances in the peripheral vascular system and the etiology of rheumatoid arthritis is based on such things as the presence of cold hands and feet, increased sweating, abnormal response to cold, decreased capillary circulation in the nail beds, delayed removal of sugar from the blood and improvement of symptoms following procedures which produce vasodilatation. On histological examination of the periarticular and synovial membranes in rheumatoid arthritis, one is impressed by the large blood supply and multiplicity of open capillaries. There seems to be no vasoconstriction present in the periarticular tissues of involved joints. If there is an etiological relationship between the peripheral vascular system and rheumatoid arthritis, one should expect to observe the frequent association of rheumatoid arthritis with such conditions as thrombo-angiitis obliterans, arteriosclerotic occlusions, Raynaud's syndrome and scleroderma. However, it is commonly known that rheumatoid arthritis is infrequent in these vascular diseases. The studies of the sugar tolerance curve in patients with rheumatoid arthritis have been unconvincing. Much of the work has been done without due regard to such varying factors as the patient's age and state of nutrition, the amount of sugar ingested, the variation in the curve in the individual patient (either the normal individual or the patient with disease) from day to day, and the variation between arterial and venous blood sugar curves.

Recently the rôle of the sympathetic nervous system in the etiology of rheumatoid arthritis has received attention because of the treatment by sympathectomy. It is well to point out that all patients with rheumatoid arthritis do not have vasomotor disturbances, even late in the course of the disease. It is rather difficult to understand how vasomotor reactions can produce inflammatory changes in the synovial membranes. Furthermore, rheumatoid arthritis has not been completely arrested in patients who have had sympathectomies. It would seem rather that the vasomotor phenomena contribute to the symptomatology than that they play a rôle in the cause of rheumatoid arthritis.

The infectious theory, or rather theories, are based on the presence of slight fever, leukocytosis, increased erythrocytic sedimentation rate, the inflammatory nature of the lesions of the synovial membrane and periarticular tissues, enlargement of the lymph nodes in the region of the joints and the characteristically exudative nature of the synovial fluid.

To accept the theory that rheumatoid arthritis is infectious in origin one implies that the disease is secondary to focal infection. To adhere to this view one must establish first the existence of a focus of infection; secondly, the capability of this focus to disseminate toxin or organisms; and thirdly, that the damage to the joints has resulted from such a dissemination of bacteria or bacterial products. In many cases it is possible to satisfy these requirements; in others, it is apparently not possible to do so. We may see patients in whom rheumatoid arthritis follows closely a streptococcal infection as of the tonsils. Although no organisms are present in the joint tissues, it is difficult to deny that there may be a definite causal relationship. The precise mechanism whereby the joint inflammation is set up, however, is obscure.

Improvement or exacerbation of the symptoms of arthritis may follow removal of foci of infection. This has been interpreted as indicative of a causal relationship. Yet it has also been pointed out that the improvement may be due to a general and nonspecific stimulus resulting from the removal of one cause of a lowered systemic resistance. The failure to observe improvement following removal of all available foci, the presence of arthritis without evident foci of infection, and the occurrence of improvement without relationship to the eradication of foci, have raised questions of doubt in the minds of many concerning the validity of the causal relationship between foci of infection and rheumatoid arthritis.

The controversy which has arisen concerning the bacteriological studies of blood and synovial fluid from patients with rheumatoid arthritis has failed to establish a relationship between foci of infection and rheumatoid arthritis. The significance of the presence of antibodies to the hemolytic streptococcus in the blood serum of patients with rheumatoid arthritis is difficult to determine. The frequency with which agglutinins and precipitins to the hemolytic streptococci are found in the blood sera of patients with rheumatoid arthritis is such that their presence cannot be disregarded as a chance finding (Keefer, Myers and Oppel). The question as to their specificity, however, has been raised. Are they specific antibodies to the hemolytic streptococcus or are they nonspecific in nature and comparable to the Wassermann and Weil-Felix reactions? The result of the studies of skin sensitivity to bacteria and bacterial products are likewise difficult to interpret (Myers, Keefer and Oppel).

To accept the view that rheumatoid arthritis is a metastatic lesion from a focus of infection it is necessary to find organisms in the joint tissues or synovial fluids. Some investigators feel that this has been demonstrated. However, numerous competent workers have been unable to confirm this work. Until it is possible for all investigators to find organisms in the synovial tissues or fluids it cannot be accepted that rheumatoid arthritis is the result of metastatic lesions from a focus of infection.

Hence, it is postulated that the reactions in the joints are the response to toxic products or a hypersensitivity to products of organisms.

The observation of joint disease in serum sickness and occasionally in asthma and hay fever lends support to the allergic theory. Skin sensitivity to the hemolytic streptococcus in 70 to 80 per cent of patients with rheumatoid arthritis and but 40 per cent of control individuals may be of etiological significance. If the difference in the percentage of positive reactors in the two groups were greater, this would be more impressive. It is probable that patients may fail to show positive skin reactions and yet their periarticular tissues may be sensitive to the antigen used. In the face of the available evidence, it is not possible as yet to accept as proved the allergic hypothesis. This mode of approach to the study of rheumatoid arthritis suggests further investigation. The evidence at hand is highly suggestive that rheumatoid arthritis is an infectious disease. It remains for the mechanism whereby infection produces its effects to be proved beyond doubt.

In conclusion, one may say that no one of these three theories as to the etiology of rheumatoid arthritis is conclusive. We are slowly reaching a better understanding of the anatomical and physiological changes that occur in arthritis. As a result of more critical attention being given the patient with chronic arthritis, the clinical varieties of the disease are being differentiated. Thought and investigation in the fundamental problems are being stimulated. A better understanding of this disease may be expected to lead to better and more satisfactory methods of control and treatment.

BIBLIOGRAPHY

Archer, B. H.: Chronic Nonspecific Arthritis; Etiology and Treatment, with Special Reference to Vaccine Therapy. J. A. M. A., 1934, **102**, 1,449.

Bauer, W.: What Should the Patient with Arthritis Eat? J. A. M. A., 1935, **104**, 1.

Bloomfield, A. L., and Keefer, C. S.: The Significance of Gastric Anacidity. Bull. Johns Hopkins Hosp., 1926, **39**, 304.

Haft, H. H.: Colon Changes in Chronic Arthritis Compared with Other Chronic Diseases. Am. J. M. Sc. 1933, **185**, 811.

Keefer, C. S., Myers, W. K., and Oppel, T. W.: Streptococcal Agglutinins in Patients with Rheumatoid (Atrophic) Arthritis and Acute Rheumatic Fever. J. Clin. Investigation, 1933, **12**, 267.

Keefer, C. S., Parker, F., Jr., Myers, W. K., and Irwin, R. L.: Relationship Between Anatomic Changes in Knee Joint with Advancing Age and Degenerative Arthritis. Arch. Int. Med., 1934, **53**, 325.

Miller, S., and Smith, F. B.: An Investigation of Gastric Function in Chronic Arthritis and Fibrositis. Quart. J. Med., 1927, **20**, 271.

Myers, W. K., Keefer, C. S., and Oppel, T. W.: Skin Reactions to Nucleoprotein of Streptococcus Scarlatinae in Patients with Rheumatoid Arthritis and Rheumatic Fever. J. Clin. Investigation, 1933, **12**, 279.

Nissen, H. A.: Atonic Stasis; Clinical and Laboratory Study of Intestinal Variations in Chronic Disease. M. Clin. North America, 1929, **13**, 269.

Typhoid in the C. C. C.—The Civilian Conservation Corps has now been in existence for about 3 years and up to December 31, 1935, 1,401,199 men have been enrolled, some of whom have stayed but a few months but many have completed two enrollment periods of 6 months each. These men are for the most part at the susceptible age for infections of the typhoid group. Furthermore these men have been scattered in several thousand camps, largely in rural areas and although potable water may be supplied the camp the men going on pass or on work parties have the opportunity of drinking polluted water very readily. . . .

In all but 18 cases the diagnosis was based on positive laboratory findings. In these 18 cases the laboratory findings were negative but the patients had sufficient clinical signs to warrant the diagnosis. There were 3 other cases in which the reports stated the diagnosis was based on the clinical course together with positive laboratory findings, although just what the specific findings were is not known. In one fatal case the laboratory findings were negative but the diagnosis was confirmed by autopsy. In the remaining 81 cases either the blood, stools, urine, singly or together were positive. The stools were positive in 62 cases, the blood in 38 and the urine in 10. . . .

. . . The following shows the number of cases developing before prophylaxis was completed:

YEAR	TOTAL CASES	CASES DEVELOPING PRIOR TO COMPLETION OF PROPHYLAXIS	PER CENT
1933	54	5	9.26
1934	78	6	7.69
1935	105	22	20.95

When it is considered that only 237 cases of typhoid have occurred among almost 1,500,000 individuals exposed and that 33 of these were probably infected prior to enrollment, the Medical Department may feel justly proud. Furthermore, there have been but 18 deaths.

Extract from article by Lieutenant Colonel George F. Lull, M.D., U. S. Army, *The Military Surgeon, July, 1936, p. 45.*

DIABETIC GANGRENE COMPLICATED BY WELCH BACILLUS INFECTION*

REPORT OF A CASE

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Time will not permit a complete discussion of all or any one of the several surgical problems presented by the patient whose case I am reporting. However, I will hastily review the etiology and treatment of anaerobic, gas-forming infections.

It has been estimated that there are about 100 members of organisms in the genus clostridium or bacilli which grow in the absence of oxygen and form spores. Only 7 of these are pathogenic for man, namely, the Bacilli tetanus, botulinus, welchii, vibrion septique, oedematiens, histolyticus, and fallax. The last 5 organisms cause malignant wound infection with the collection of gas.

The most frequent, gas-producing, anaerobic offender is the Clostridium welchii, isolated by Welch in 1893, 40 years after Maissonneuve first described gas gangrene. This organism also goes by the names, gas bacillus, Bacillus aerogenes capsulatus, Bacillus phlegmonis emphysematosae, Bacillus Fränkel and Bacillus perfringens. It is found in the intestines of man and animals, in feces, soil, woolen clothing and wads of shotgun shells. It usually invades deep, dirty wounds and produces a rapidly spreading gangrene with profound toxemia and anemia and a high mortality. The Welch bacillus is recognized in the laboratory by the microscope, culture media, fermentation tests, and inoculation of experimental animals. It is said to be the only anaerobe having a capsule, and a capsular stain has been claimed by some to be the most reliable single laboratory test for its recognition.

There are many putrefactive, gas-forming, anaerobic bacilli in soil and food and at times in the organs and muscles of animals and man. These organisms produce putrefactive gangrene in older people, in those suffering from circulatory failure, arteriosclerosis, diabetes, and Buerger's disease. This infection is not as rapid nor toxic as, and is sometimes mistaken for, true gas infection. The treatment of putrefactive gangrene is through débridement and supportive care. Amputation is considered unnecessary and perfringens antitoxin useless.

True gas gangrene is prevented by early thorough débridement of wounds and the injection of tetanus-perfringens antitoxin. Its treatment requires prompt surgery, the use of antitoxin, antiseptic irrigations of the wound, X-ray therapy and supportive care, including transfusion. Recent literature urges less radical surgery, such as multiple incisions for drainage, exposure of the tissues to air and thorough débridement. Amputation does not always eradicate the disease, and some authors report a lower mortality in nonamputated cases. Large, frequent doses of perfringens antitoxin should be used, and one must not forget the possibility of an associated tetanus infection. Dakin's solution, hydrogen peroxide, and potassium permanganate (1:100) are the most commonly used antiseptics for constant irrigation of the wound. X-ray therapy was first offered in 1931 by Dr. James F. Kelly of Omaha. Research indicates that radiation produces the formation of hydrogen peroxide in the tissues. X-ray treatment is reported to have definitely benefited gas infection of both the extremities and the trunk.

Gas gangrene is such a grave condition that all forms of therapy must be considered and employed, and one form of treatment should not be used to the exclusion of all others.

Report of Case

The patient was a small, thin, colored widow of 62 years. In 1926 she had refused operation for a fibroid uterus. For the past 2 years she had had cataracts in both eyes and diabetes mellitus which had been controlled by diet. About Thanksgiving, 1935, she contracted grippe and 10 days later became ill with headache, abdominal pain, occasional vomiting and inability to take nourishment. For some time her right great toe had been sore and she had used hot magnesium sulphate soaks. On December 9, a physician found her temperature 102°F., the pulse rate 98 and regular but weak, and her blood pressure 130 systolic and 70 diastolic. She was dehydrated and had an acetone breath. The lungs were clear, heart sounds weak, and there was a fibroid tumor of the uterus. The right great toe was slightly tender and showed a sanguinopurulent discharge about the nail. Both feet were of good color and the vessels pulsated. She was sent to the hospital, where the next day she became drowsy and fine râles were heard in both lungs. Her blood sugar was found to be 380 mg. per cent, the CO_2 combining power 13 volumes per cent and the urine to contain sugar, a large amount of albumin and hyaline and granular casts. She was immediately given insulin and intravenous therapy.

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* Read before the Annual Scientific Assembly (Surgical Dry Clinics) of the Society, May 7, 1936.

I was asked to see the patient on December 11 because her toe had become gangrenous since admission to the hospital. Her temperature was 102°F. and the pulse rate 96. She was quite drowsy and dehydrated. The right great toe was bluish-black, edematous, cool, moist, and the epidermis was loose; a serosanguineous discharge was present about the nail, and air crepitation could be felt in the toe. Pulsation was distinctly felt in the posterior tibial artery and faintly so in the dorsalis pedis. The right foot was edematous but no adenopathy was present in the groin. At this time her blood sugar was 285 mg. per cent, the chlorides 412 mg. per cent, the hemoglobin 65 per cent, the red blood cells 4,290,000 and the leukocytes 12,600 per cubic millimeter of blood, with 90 per cent polymorphonuclear neutrophiles and 47 per cent band forms. The blood culture was negative. The impression was that she had moist gangrene with infection of the right great toe in the presence of diabetes and acidosis. The condition did not appear to be that of gas gangrene at this time. That day, December 11, the lower leg was amputated at the upper third under spinal anesthesia. A tourniquet was not used. The blood vessels were not thrombotic and appeared only slightly sclerotic. The muscles were of good color and reacted well.

For 2 days the patient's condition improved. The blood nonprotein nitrogen dropped to 30 mg. per cent and the blood sugar decreased to 143 mg. per cent, but the CO_2 combining power remained at 30 volumes per cent. Her hemoglobin was 61 per cent, and the white blood count fell to 11,700, with 88 per cent polymorphonuclear neutrophiles and 25 per cent band forms.

On the third postoperative day, December 14, her temperature rose to 103°F., the pulse rate to 120, and she complained of some pain in the stump. The flaps had become discolored and the wound was partly opened. Both lungs were filled with râles. In spite of transfusions her hemoglobin had dropped to 45 per cent and the red blood cells to 2,650,000. The leukocytes were 15,150, with 90 per cent polymorphonuclear neutrophiles and 24 per cent band forms. A blood culture was again negative.

On the fifth day, December 16, her temperature was septic, reaching 103°F., and her pulse rate was 120. The flaps of the stump were gangrenous, and the wound was sloughing and discharging a serosanguineous fluid. There was a foul odor, and air crepitation was noted beneath the flaps. The wound was opened widely and "Dakinized." At this time her blood sugar was 95 mg. per cent, and the CO_2 combining power was 42 volumes per cent.

On December 18, the seventh day after operation, a culture of the wound showed the presence of Welch bacilli and hemolytic streptococci. There was extensive sloughing of black muscle with a foul odor and escape of gas from the stump. Induration, edema and tenderness were extending up the medial and lateral surfaces of the thigh. Both lungs were filled with râles, and patchy consolidation was thought to be present. Her temperature was 103.6°F., the pulse rate was 120, the hemoglobin was 43 per cent, the red blood cells were 3,380,000, and the leukocytes were 23,150, with 91 per cent polymorphonuclear neutrophiles. The wound was extensively débrided in the patient's room without anesthesia and "Dakinized" constantly. Daily débridements were done and daily transfusions given. In 3 days she received 40,000 units (80 cc.) of perfringens antitoxin, partly in the right thigh and partly in the abdominal muscles.

On the ninth postoperative day, December 20, the patient was better. Her temperature had dropped to 99.6°F., and her pulse rate was between 90 and 100. The infection seemed to be subsiding except for a narrow, elongated area of superficial gangrene with air crepitus on the lower, lateral side of the thigh. This was débrided and the stump treated with x-ray. The wound was cleaner, the induration on each side of the thigh less, the lungs clearer, and the diabetes under better control.

During the next 4 weeks her condition slowly improved, so that she was sitting up in a wheel-chair. Her temperature remained normal and her pulse rate between 80 and 90. During this time she had several attacks of diarrhea, but stool cultures were negative for typhoid-dysentery organisms. By January 18 she had had 12 transfusions; her hemoglobin was 72 per cent, the red blood cells were 4,100,000, and the white blood count was 5,400, with 74 per cent polymorphonuclear neutrophiles and 14 per cent band forms; the blood nonprotein nitrogen was 41 mg. per cent, and the CO_2 combining power 60 volumes per cent. By the end of January the stump was clean and granulating but without skin to cover it. The tibia and fibula protruded. There was a narrow, superficial granulating wound on the lower lateral side of the thigh from which some fascia lata had sloughed. A bacterial count of the stump showed 3 organisms per field and of the thigh wound less than 1 organism per field.

On January 31, a guillotine amputation was done through the upper third of the right thigh under spinal anesthesia.

The third day after the second amputation, February 3, her temperature rose to 101.6°F., and pulse rate to 120. On the middle of the posterior flap of the stump there appeared a slightly darkened, tender, indurated area, but there was no crepitus. The wound was partly opened in its middle, 20,000 units of perfringens antitoxin was injected into the thigh, and the wound irradiated. On February 5 her temperature dropped to almost normal and the wound appeared healthy.

When she left the hospital, on February 22, the stump was clean and almost healed, her diabetic condition was quite satisfactory, and she required much less insulin than formerly.

Microscopic study of the main artery of the amputated limb showed some arteriosclerosis and periarteritis. These lesions were more marked in the vessel below the knee than above.

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(Continued from June, 1936)

ANTOINE SCHNEIDER, M. D.
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DISEASES OF UNKNOWN ETIOLOGY

MULTIPLE SCLEROSIS

This disease is one of the most wide-spread, and at the same time one of the most puzzling, of the diseases of the central nervous system. Possibly only syphilis of the central nervous system is more frequent. A great number of possible etiological factors have been suggested, but so far none of these have been definitely proved to be the factor responsible for the clinical or pathological manifestations. All sorts of organisms, both microscopic and ultramicroscopic, spirochetes, toxins, viruses, etc., have been popularly supposed, at some time, to have some etiological relationship. At best one may say that there is some suggestion, from pathological bases, that the disease may be due to some toxic-infectious process.

The pathological picture is one of wide-spread, diffuse demyelinization of fibers of the central nervous system, affecting those of the spinal cord mainly, and to a lesser degree, those of the medulla, brain stem, cerebellum, and cerebrum proper. Scattered areas of loss of myelin are seen, with the axis-cylinders affected only slightly, and probably later, in the course of the disease. The gray matter appears to be immune. The wide-spread and scattered lesions explain the multiplicity of clinical signs and symptoms.

Clinically this is a disease of protean manifestations. A number of investigators have described groups of signs and symptoms that are supposedly characteristic and diagnostic of this condition. Unfortunately, however, these groupings are found usually only in terminal or institutional cases. Certain generalities, however, may be attempted. In the first place, the disease usually affects young adults, and these are predominantly of the Celtic or Scandinavian races as well as the Teutonic. The Latin races, Negroes and Hebrews are rarely affected. The commonest symptoms and signs, and also probably the earliest are spasticity, loss of abdominal reflexes, nystagmus and ataxia. These may be called the primary signs and are practically always found at one stage or another of the disease. Added to these there may be a variety of subjective and objective sensory disturbances, such as paresthesias, anesthesias and hyperesthesias. Disturbance of bladder function, with retention or incontinence, is fairly common but usually occurs rather late in the course of the disease. The deep reflexes are usually increased but not necessarily symmetrically, and abnormal reflexes commonly make their appearance. Speech disturbances, such as scanning speech, are always mentioned in connection with multiple sclerosis, but as a matter of fact, are only rarely observed. When the disease affects the fibers of the brain stem, a variety of symptoms referable to these structures will be observed. These may be in the nature of extra-ocular disturbances, of facial paralyses, of facial anesthesias, and of difficulty in deglutition and in phonation. Certain mental aberrations are commonly met with in the course of multiple sclerosis, but these are most evident in the long-standing, chronic cases. The commonest mental changes are in the nature of a mild euphoria, although the opposite, namely depression, is occasionally met with.

The course of multiple sclerosis is an extremely irregular and uncertain one. It may progress rapidly, it may remain static, or complete remissions may set in for long periods of time. The classical course of multiple sclerosis is characterized by periods of remission and of exacerbation. As a general rule, however, the tendency is toward a progressive, downward course, even in the face of frequent remissions. Death is usually due to intercurrent infections or to infections dependent upon bladder paralysis, such as cystitis and nephritis. Infected trophic sores may sometimes cause septicemia and death. The diagnosis is based upon evidence of wide-spread disturbance of nervous function, on the presence of such important symptoms as nystagmus, spasticity, loss of abdominal reflexes and ataxia, the absence of any etiological factor, a course frequently characterized by exacerbation and remission, rather early onset, and a predilection for the Northern races. The spinal fluid is of little aid in diagnosis except for the presence, in 20 to 25 per cent of the cases, of a paretic gold curve.

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* This is the tenth instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates. Other instalments will follow until completion.

The question of treatment is an extremely unsatisfactory one. A great number of therapeutic measures have been advocated, but so far very few of these have been proved to be of definite value. Among the best may be mentioned the use of combined typhoid and paratyphoid vaccine. Twelve to 14 injections of this vaccine should be given, beginning with a dose of about 20,000,000 bacteria. The temperature rise should reach 104°F. several hours after intravenous injection. There is considerable evidence that this procedure has definite value in certain cases, but its application is not universal. The use of malaria has been rather disappointing. Daily large doses of quinine have been reported as having caused good results in certain cases.

SUBACUTE COMBINED DEGENERATION

This disease of the nervous system has long been recognized to be connected in some way with pernicious anemia. The exact relationship, causal or otherwise, is as yet unknown. It is rare indeed to find even the clinical symptomatology of subacute combined degeneration in the course of other diseases. Among these may be mentioned an occasional case of severe secondary anemia, and the rare cases of infection with Bothriocephalus latus. For practical purposes, it must always be considered in connection with pernicious anemia.

The pathological changes within the central nervous system are rather specific. These consist of scattered areas of softening affecting the white matter, both axis-cylinders and myelin sheaths, and with very little replacement by glial tissue. The cord is most seriously affected, although such areas of softening may also be seen in the brain stem and in the brain. The appearance of these softenings suggests an etiological process of toxic nature.

Since the pathological process affects both the sensory and motor tracts of the central nervous system, the symptomatology depends to a great extent upon the degree of involvement of these two systems. As a general rule, both motor and sensory symptoms are present, usually with a predominance of one or the other. One of the commonest and earliest symptoms is that of paresthesias in the nature of numbness, tingling, or "pins and needles" sensation in the fingers and in the toes. These sensory disturbances may, at times, be quite painful. The sense of coördination is frequently involved, and ataxia, especially in the finer movements, appears. The patients frequently complain of difficulty in sewing, or in buttoning the clothes. One of the most striking of the objective findings is loss of the sense of vibration, especially in the distal portions of the extremities. The sense of position is very frequently impaired, or completely lost. Objective anesthesia or hyperesthesia is seen fairly frequently, especially in the hands and feet. If the central lesion is one predominantly of the motor tracts, the picture may be that of a spastic paralysis with hypertonus, increase in reflexes, spasticity, and the appearance of abnormal reflexes. On the other hand, if the lesion is principally sensory, the opposite picture may be evident. This would be in the nature of hypotonia, flaccidity, and loss or diminution of reflexes. Bladder disturbances occur rather late, but are not uncommon. Trophic disturbances, too, are usually terminal manifestations. If considerable cerebral involvement is present, or if the anemia be extremely marked, psychotic symptoms in the nature of depressions or of delusions and hallucinations may be noted.

The course of the disease is variable, but if untreated, is usually progressive. Death usually follows cachexia, pneumonia, ascending urinary infection, or septicemia from infected trophic sores.

The diagnosis of subacute combined degeneration is made on the basis of signs and symptoms implicating the motor and sensory tracts of the cord especially, and on an association with pernicious anemia. The symptoms may appear before the anemia becomes obvious, or, on the other hand, may be absent even in the presence of a severe anemia. There is one rule, however, that applies to practically all cases, and that is the absence of free hydrochloric acid in the stomach, no matter what the status of the nervous system or blood changes may be at the time. Early loss or diminution in vibration sense is an especially important symptom in these cases. The spinal fluid is of practically no diagnostic value.

Treatment in subacute combined degeneration is based practically entirely upon the ingestion or injection of liver. Empiricism is impossible as regards dosage, which must be regulated by the clinical status of the patient, as well as by the condition of the blood. Treatment must also be continued even during the course of spontaneous or induced remission. In respect to treatment, certain important facts must be borne in mind. Once permanent damage has been done to the structures of the central nervous system, no amount of therapy will induce regeneration and return of function. On the other hand, marked improvement in certain symptoms during the course of treatment makes us believe that such symptoms depend upon irritation of nervous centers or tracts preceding the stage of actual destruction. With improvement in the anemia there also occurs an improvement in the general bodily strength. Weakness of muscular origin frequently simulates neurological disturbance. Especially important is the well-proved fact that early and adequate treatment of pernicious anemia, before the appearance of central nervous system symptoms, will effectively prevent the appearance of such symptoms. This statement may be questioned, but wherever symptoms of involvement of the central nervous system appear during the course of treatment, it will probably always be found that such treatment has been inadequate.

SYRINGOMYELIA

This condition, which is by no means uncommon, is characterized by the formation of cavities within the cord and medulla. Cavitation within the medulla is more properly known as syringobulbia.

It appears quite probable that the cavitation itself is preceded by the formation of areas of gliosis within the cord. These areas then break down to become cystic and to form cavities. The cavities are most often located in the cervical region, but are fairly frequently found within the medulla and in other areas of the cord. Several cavities may exist at the same time and become confluent. They usually begin about the central canal of the cord, then spread to destroy the anterior commissure, the gray matter of the cord, and finally involve to a certain extent the white matter. The cavities contain a yellowish fluid which is usually under considerable pressure. These cavities have a tendency to spread up and down the cord in the gray column, leaving the white matter comparatively unaffected.

Since the anterior commissure is affected very early, the fibers that cross in this commissure are soon destroyed. These are principally the fibers that convey pain and temperature sensation. One of the most characteristic symptoms, therefore, is loss of pain and temperature sense in a given area of the body, with preservation of the sense of touch. As a result of the loss of pain and temperature sense, the patients very often burn or injure themselves severely without being conscious of it. As the gray matter becomes progressively involved, other symptoms, both sensory and motor, make their appearance. These secondary sensory disturbances are usually in the nature of numbness, or painful tingling, or "pins and needles" sensation. As the anterior horns become involved, fibrillations, followed by atrophy, make their appearance. These fibrillations and atrophies usually begin in the distal portions of the limbs and ascend. The reflexes are generally diminished or lost. A number of other symptoms, probably referable to lesions of the sympathetic lateral horns, also appear. These are principally trophic and vasomotor disturbances. Such disturbances are quite varied. One sometimes sees perforating painless ulcers and arthropathies similar to those seen in tabes dorsalis. Spontaneous fractures and painless ulcerations of the fingers may also occur. Syringomyelic lesions in the lower cervical region frequently produce typical Horner's syndrome, consisting of enophthalmos, narrowing of the palpebral fissure and contraction of the pupil. A secondary sign that is almost a constant accompaniment of syringomyelia is that of varying degrees of scoliosis. When the cavitation involves the medulla, a number of symptoms and signs referable to lesions in this region are apparent. Fibrillations and atrophy of the tongue are especially common. Paralysis of the muscles of swallowing and of phonation are not unusual. Involvement in this region very often gives the symptom of anesthesias in the distribution of the trigeminal nerve on the one side, and loss of pain and temperature on the opposite side of the body.

The course of the disease may be quite long, sometimes as long as 40 years. Progression is, as a rule, quite slow, and death generally results from some sort of bulbar involvement.

The diagnosis can usually be made comparatively easily, and is most often based on evidence of loss of pain and temperature in certain segmental distributions accompanied by muscular atrophy and fibrillation.

Treatment is either by surgery or by X-ray, the former being the most satisfactory in the majority of cases. A laminectomy is performed and the cystic cavity is incised, allowing the fluid to evacuate itself. Since the fluid within the cavity is under increased pressure, a number of symptoms probably depend upon this pressure, and disappear with the evacuation of the cyst. The results of X-ray therapy are not quite as encouraging, but may be tried if surgery has proven inadvisable.

AMYOTROPHIC LATERAL SCLEROSIS

This is exclusively a disease of the motor portions of the central nervous system, involving both upper and lower motor neurons. It is characterized by degeneration of the long descending motor tracts as well as of the cells of the anterior horns. When the lower motor neuron involvement occurs principally in the medulla, the condition is known as progressive bulbar paralysis. Bearing in mind the extent of pathological involvement, one may easily understand the clinical manifestations. The disease is characterized by the onset of muscular fibrillations, accompanied by marked atrophy, and at the same time by spastic phenomena. Spasticity is usually most pronounced in the lower extremities. Notwithstanding the muscular atrophy, the reflexes become hyperactive, and clonus and abnormal reflexes appear. Bulbar involvement betrays itself by atrophy of the muscles of the face, jaws and tongue, and difficulty in speech and in swallowing.

The disease is usually of short duration, the patients rarely surviving for longer than a period of a few years. In the presence of marked bulbar involvement, death frequently supervenes within a space of 6 to 8 months. The diagnosis is made on a combination of upper and lower motor neuron symptoms in the complete absence of any sensory disturbance. No known treatment is of any avail.

PROGRESSIVE MUSCULAR ATROPHY

This is a chronic, progressive disease of the central nervous system, quite similar to amyotrophic lateral sclerosis except for the fact that the upper motor neuron disturbance is here absent. The lesions are confined entirely to the anterior horn cells of the cord and of the medulla. These cells slowly atrophy and give rise to a clinical picture which is composed principally of weakness, paralysis, motor atrophy and fibrillation. The reflexes are diminished or lost. There is at no time spasticity, increase in reflexes, or abnormal reflexes; nor is there at any time any evidence of sensory involvement whatsoever. The clinical symptoms most often begin in the lower extremities with atrophies, fibrillations and motor weakness. The small muscles of the hands also show early atrophy. As a general rule, the disease is only slowly progressive and may last for a great many years before death finally supervenes. An exception to this statement is in the case of marked bulbar involvement. It might be mentioned that most of the circus freaks called human skeletons are usually cases of progressive muscular atrophy. In rare cases, syphilis of the central nervous system may simulate this picture, but this etiological factor is easily ruled out by serological tests. Treatment in these cases is purely symptomatic. If marked dysphasia occurs, life may be prolonged for a long period of time by gastrostomy.

MYASTHENIA GRAVIS

Myasthenia gravis is still another disease of pure motor symptomatology. It usually occurs in the twenties, and affects females more often than males. Not only is it .a rare disease of unknown etiology, but actual pathological changes in the central or peripheral systems are entirely absent. It is characterized clinically by easy fatigability and later by paralysis of muscles. Any or all muscles of the body may be implicated, but, as a general rule, those supplied by the bulbar nuclei are the most seriously affected. The clinical picture is quite characteristic. The patient usually first complains that after chewing for a while he becomes fatigued and is no longer able to continue, or that after talking for a certain period his voice becomes weak and he will finally become aphonic; or that while reading his eyelids will droop and he will be unable to raise them. Oftentimes the extra-ocular muscles become paralyzed, and diplopia or strabismus may result for a period of time. As a general rule, and especially at first, motor power returns after rest. The facial muscles frequently become fatigued and the facial expression becomes quite blank. The same fatigability and paralysis applies to muscles elsewhere, and may be noticed after walking, writing, or any sort of exercise. Even the reflexes are affected and may become progressively weaker upon continuous stimulation. The course is usually progressive, although spontaneous remissions have been recorded. Within recent years a number of cases of successful treatment by means of ephedrine have been reported. Certain other cases have been benefited by the addition of glycine as well. Other treatment is purely symptomatic and consists essentially in the avoidance of fatigue and plenty of rest. Feeding is often quite a problem and must be done slowly and the food given in small amounts.

TICS

Tics, or involuntary spasms, may be grouped under the general heading of dyskinesias. It is an unquestionable fact that many of these tics and spasms may be due to psychogenic factors, usually hysterical; but, on the other hand, it must be remembered that they occur in the course of a number of known organic diseases, and it is quite probable that a number of these tics have an organic background, although no definite lesion can be found. Since we are quite at sea as regards the etiology and pathological localization, it is probably best to classify tics in relation to the parts that they affect.

Facial tic is probably the commonest of all. While it is sometimes seen as one of the residuals of encephalitis or an irritative lesion of the facial nerve, as a general thing the etiology is unknown. It usually consists of a sudden, generalized twitch involving all of the muscles supplied by the facial nerve on one side. Even the platysma is included. Sometimes the tic involves only one group of muscles, or even one muscle, most frequently the orbicularis oculi. When the tic, instead of being intermittent or occasional, becomes constant, it is then known as facial spasm. The condition is extraordinarily resistant to therapy. All sorts of drugs and every type of physiotherapy have been tried with extremely poor results. The only treatment affording any hope is alcohol injection of the facial nerve. This causes a temporary facial paralysis lasting from one to two months, but, as a general rule, the facial tic, or facial spasm, will not reappear for a considerably longer space of time. Needless to say, this type of treatment is rather radical and often inapplicable.

Torticollis, or cervical spasm belongs in this group of dyskinesias. It consists of constant, or transient, spasms of the sternocleidomastoid muscle with rotation of the head to one side. In such cases the muscle on one side is often found to be considerably hypertrophied. Torticollis is sometimes seen in diseases of the vertebrae or in rheumatic myositis, but, as a general rule, the etiology is obscure. It usually persists throughout a lifetime, often becoming more severe and spreading to other groups of cervical muscles. Practically no form of treatment is curative. Very often the spinal accessory nerve is cut with temporary relief, although with paralysis of the muscles affected. However, it has been noted that after a period of time, the torticollis has spread to other, adjacent muscles of the neck. Orthopedic measures are equally ineffective.

Spasms of the pharynx, larynx, tongue, and muscles of mastication are most often hysterical in nature. Hiccough is a true spasm which depends upon sudden contractions of the diaphragm. It is of common occurrence and usually of very little significance, but occasionally becomes an extraordinarily serious disturbance. If not arrested, the patient becomes progressively more exhausted, is unable to sleep, and finally may die. Sedative and hypnotic drugs must be used, and even in certain cases evulsion of the phrenic nerve has been performed.

MIGRAINE

Migraine is a disease of unknown etiology, supposed by many to have some vague relationship to epilepsy. While the definite etiology is unknown, there are certain cases in which endocrine dysfunction, or on the other hand, transient cerebral vascular spasms, are strongly suggested. No definite pathology for this condition has ever been really established.

The disease itself appears to have some familial tendency; affects females considerably more often than males, usually appears rather early in life, about the second or third decade, and usually disappears about the fifth or sixth decade. It is characterized by periodic paroxysms of severe headaches that are usually located on one side of the head, or in one particular location in the head. At times the attacks are strikingly periodic in nature, and at other times appear to be related to the menstrual function. The attack is usually preceded by a feeling of malaise, or of general oppression, and most frequently by certain visual disorders. The visual fields may become contracted, actual hemianopsia may occur, blind spots may appear, or scintillating scotomata may be seen. These scintillating scotomata usually take the form of spots of bright light that may actually involve most of the field of vision. The headache then appears, growing in intensity until at times it becomes almost unbearable. It is sometimes accompanied by tenderness over the head, often by photophobia, and also often by gastric disturbances such as nausea and vomiting. The attack gradually subsides, usually after a period of several hours, sometimes as long as a day, and is followed by a period of somnolence.

Until quite recently the treatment of migraine was rather unsatisfactory, and principal reliance was placed upon the use of the coal tar drugs. Morphine and hypnotics were avoided on account of the serious danger of drug addiction. More recently, however, ergotamine tartrate, or as it is more commonly known, gynergen, has been used with considerable success. Its value is especially enhanced when the approximate time of onset of the attack may be suspected before its appearance. If administered shortly previous to the attack, it very frequently aborts it. Even during the attack itself, if given intramuscularly and intravenously, it may shorten the period of the attack considerably and reduce the pain. It is usually given in doses of 0.50 mg. intramuscularly, or 0.25 mg. intravenously. This may be safely repeated once after approximately 3 hours if necessary. Larger doses may be given by mouth, but, as a general rule, are much less effective than the intramuscular or intravenous medication. Needless to say, other symptomatic treatment is always indicated, such as a dark room, cold compresses to the head, quiet and rest.

(To be continued)

Some Observations Concerning the Relation of Handedness to the Language Mechanism.—Much has been written on the subject of aphasia from lesions in the language zone of the cerebral hemispheres. The authors have usually described and defined the factors operative in the cerebral mechanism of symbolic formulation and expression, but the handedness of the patients has been rarely dwelt upon. It is the purpose of the writer to record observations concerning the relation of handedness to the language mechanism.

The term cerebral dominance is commonly used to indicate the controlling influence of the right or left cerebral hemisphere in the integration and operation of the language mechanism. This influence has been assumed by neurologists to be operative in only one of the two cerebral hemispheres, and to be exerted by the hemisphere contralateral to the preferred hand of the individual. The anatomical area is referred to in this paper as the language zone.

During the past 5 years the writer has had occasion to study 240 patients with lesions in the language zone of one of the cerebral hemispheres. Of this series, 76 have been excluded because of uncertainty regarding the extent and distribution of the lesions. The 76 cases consisted of patients who developed aphasia in the course of infections, vascular lesions, cerebral metastases and after skull trauma. In these individuals neurological findings pointed to the existence of one large lesion which was felt to be responsible for the aphasic state, but smaller lesions in the language zone of the opposite hemisphere could not be excluded.

The remaining cases fall into three groups: Group 1 is comprised of 89 patients who had a discrete lesion within the language zone of the left cerebral hemisphere. Of these 89 patients, 87 had tumors of the brain, and 2 developed speech disturbances after an operative procedure with transcortical approach to a tumor situated within a ventricle. The location of the lesion was verified by at least two of the following procedures: Air studies (encephalography and ventriculography), operation or postmortem examination. All, excepting one, of this group were aphasic. All of the patients in this group were right-handed, i.e., they showed a preference for the right hand in the performance of all acts where only one hand was required, such as writing, drawing, sewing, throwing, bowling, shaving, using a knife, scissors or hammer, as well as in acts which required both hands, but necessitated a preferentially lateralizing pattern such as batting, golf, rifle shooting or using an axe or broom. None gave a high incidence of left-handedness in the family. One patient who was entirely left-handed, of a right-handed family, had a tumor in the language zone of the left hemisphere and was not aphasic.

Group 2 is made up of 68 patients, with discrete lesions in the language zone of the right cerebral hemisphere. All but two of these individuals were purely right-handed and of these none was aphasic. Two purely left-handed individuals with tumors in the right language zone were aphasic.

In the 157 cases in Groups 1 and 2, with lesions in the language zone, the ability to formulate and to express in language appeared to be dependent upon a factor which is operative in only one cerebral hemisphere, this hemisphere being the one opposite to the universally preferred hand.

Group 3 is composed of 9 patients who gave a history of mixed motor preferences. The term ambidextrous is not used in this paper because it implies lack of preference for either hand and an equally high degree of skill in either hand for any given act. The degree of pattern admixture varied considerably between individuals. . . .

Case 1: . . . A male of 60, stated that by preference he had used his left hand for all acts until he began school at the age of 7, when he was trained to write with his right hand. Throughout life he continued to use his left hand by preference for such acts as throwing a ball, batting, playing tennis, bowling and rifle and pistol shooting. For some acts he admitted facility with either hand without preference, e.g., using hammer, tooth-brush, screw-driver or razor; the only acts done exclusively with the right hand were writing and drawing. He regarded himself as left-handed. The patient had a marked aphasia. Autopsy revealed an extensive glioma in the language zone of the left cerebral hemisphere.

Case 2: . . . A male of 38, considered himself left-handed. Like Case 1, his early inclination was to use the left hand. On entering school he was instructed in right hand writing, but he continued in the use of his left hand for most preferential acts. He stated, however, that he had considerable facility with either hand. Writing and drawing were never attempted with his left hand. The patient presented a moderate degree of aphasia. Air studies followed by an operation revealed an extensive glioma situated in the language zone of the left cerebral hemisphere. . . .

Case 9: . . . On admission to the hospital, this patient, a man 49 years of age, was markedly aphasic. His story regarding handedness was confusing. He insisted that he was right handed, but on careful questioning it was found that while he had a decided preference for his right hand for writing and drawing, for playing golf, tennis, ball and for bowling, he used either hand for scissors, razor, knife and tooth-brush, and preferred to use the left hand for screw-driver, hammer, hatchet, axe, and for batting a ball. At operation a large tumor was partly removed from the language zone of the right cerebral hemisphere.

The educational training of these patients with mixed motor preferences, with the exception of Case 9 who was a graduate of the New York University Law School, was limited to 8 years of elementary school. The use of the eyes, as tested by the toy telescope, a hole in a card, manoptoscope, and V-scope, revealed Cases 1, . . . to be left-eyed, and Cases 2, . . . and 9 to be right-eyed. In most of the patients tests of handedness could not be carried out satisfactorily because of the presence of a partial paralysis of one of the extremities. . . .

COMMENT: Groups 1 and 2, comprising 157 patients with localized verified lesions in the language zone of one cerebral hemisphere support the belief that the language mechanism is usually located in only one of the two cerebral hemispheres and on the side opposite to that of the universally preferred hand. From the short records . . . the individuals in Group 3 with mixed motor preferences appear to be exceptions to this rule. . . .

At what age in the development of the individual does the language mechanism become lateralized? There is little in the literature of the subject that is of help in attempting to answer this question. Much has been written on the incidence of handedness in children, as well as the age at which the tendency to lateralization of motor patterns occurs. If one accepts the statement that this lateralization of motor patterns occurs simultaneously with lateralization of the language mechanism, the handedness studies made on children would indicate that one cerebral hemisphere takes over the language function at an early age. Roos, in a study of the tendency to lateralization of motor patterns in childhood, observed its presence as early as the second year.

The writer has studied the literature in vain for cases of aphasia occurring in childhood. In our series of cases of aphasia in Group 1, 3 patients were under the age of 11 years, and all were purely right-handed and of right-handed family stock. . . .

Summary: The study of a series of 157 patients with verified localized lesions in the language zone of one cerebral hemisphere supports the view that the language mechanism resides in only one cerebral hemisphere—the hemisphere on the side opposite to that of the constantly preferred hand. When, however, as in the 9 patients of Group 3, there is a condition which we have characterized as a mixed motor pattern, the relation between the cerebral hemisphere in which the language function is located and the hand that is preferred for skilled acts, no longer obtains. For this group the view is advanced that the language mechanism is unlateralized so that a lesion on either side can produce aphasia.

Extract from article by EARL C. CHESHER, M.D., New York City, *Bulletin of the Neurological Institute of New York, April, 1936, p. 556.*

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To the Members of the Medical Society of the District of Columbia:

In assuming the highest office in the gift of your Society, I am not unmindful of the great honor you have accorded me. I shall exert every effort to make the coming year a successful one. This can be accomplished, however, only through the wholehearted coöperation and support of each individual member.

I find you have a splendid committee organization, members of which have given valuable and untiring service to your Society. Their accomplishments will have a far-reaching effect on the community. The present Central Admitting Bureau and Medical-Dental Service Bureau, components of the Medical Economic Security Administration, were proposed by your Subcommittee on Coördination of Resources for Medical Care of the Committee on Medical Economics. The plan as adopted by our Society and approved by the Community Chest and other social agencies is now in operation and is giving splendid service to the public.

There are many other achievements of which you may well be proud. Your past presidents have set a standard of accomplishments so high that it is with many misgivings that I attempt to follow them. We have given much thought to the formation of the committees for the coming year. It is believed that the work should be spread as much as possible among the members and avoid having a member holding more than one committee appointment. This will tend to relieve the individual member who in the past has had to devote time to two or more committees. We have had much difficulty in deciding committee assignments because there is so much good material from which to select; especially is this true in the group of enthusiastic younger members. While it is true your committees have accomplished much and have worked hard and faithfully for your best interests, there is yet much more to be done, especially in these troubled times when socialism is raising its venomous head in many directions, in its effort to force upon you socialized state medicine. This is no idle gesture but a stern reality.

It is up to the medical profession to "keep its skirts clean" and avoid all semblance of commercialization. It is your responsibility, as guardians of the public health, to take the initiative. You must, therefore, inaugurate and develop those agencies that will make it impossible for the state to find an excuse to take control. To that end every member of this Society should take an active interest in all of the Society's activities, familiarize himself with all that is being accomplished. Make it your duty to attend its business, as well as its scientific meetings. Do not sit back and let your committees do all the work, but give them your individual help. Without a united front the future looks hopeless in getting much needed legislation.

Again, I wish to express to you my appreciation of your confidence and with your help and support I in return pledge you my best efforts to serve you.

William Mercer Sprigg

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J. Duerson Stout
Antoine Schneider

Subcommittee on Sanitation

Eugene R. Whitmore, *Chairman*
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Subcommittee on Tuberculosis

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Charles P. Cake
W. LeRoy Dunn
J. W. Peabody

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Horatio N. Dorman, *Chairman*
Norvell Belt
Frederick A. Reuter
James M. Fadeley

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William Thornwall Davis, *Chairman*
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J. Beaty Griffith
LeRoy W. Hyde

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Arnold McNitt
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Matthew White Perry

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Gregg C. Birdsall
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Subcommittee on Coöperation with Government Agencies in Care of Indigent

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Edgar P. Copeland
Edwin S. Crisp

Subcommittee on Coördination of Resources for Medical Care

Wallace M. Yater, *Chairman*
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John D. Wynkoop
Eugene A. Taylor

Subcommittee on Dissemination of Medical Economic Information

Arch L. Riddick, *Chairman*
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R. Lomax Wells
Thomas A. Groover

Subcommittee on Government and Public Health Agencies

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Subcommittee on Hospitals and Dispensaries

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WOMAN'S AUXILIARY ADVISORY

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Sterling Ruffin	C. N. Chipman

WILLIAM MERCER SPRIGG, M.D., LL.D.

Dr. William Mercer Sprigg, the seventieth president of the Medical Society of the District of Columbia, starts his administration under auspicious circumstances. He is a descendant of colonial settlers and has spent his entire professional life in Washington. Through his accomplishments he has established an extensive practice and has gained much recognition in local medical affairs. He is the fourth son of James Crisp and Lucy Addison Sprigg, born April 3, 1864, at Petersburg, Virginia. His paternal ancestors came to this country from Northampton, England, and settled in Prince Georges County, Maryland, in 1634, receiving an original grant of land from Charles II. His maternal ancestors also came from England and were direct descendants of the Reverend Lancelot Addison, vicar of Lichfield, the father of Sir Joseph Addison, author of the Spectator.

Dr. Sprigg came to Washington in September, 1875, entering the public schools. In 1880 he went to a private school in Maryland, having earned the funds to pay for his tuition by architectural drawing and superintending construction. Before going to the University of West Virginia he had superintended part construction of 32 buildings. At the University of West Virginia, in conjunction with his other studies, he took what was then termed the pre-medical course in anatomy, physiology, chemistry and hygiene, winning the anatomy prize in 1883. In the fall of 1883, returning to Washington, he entered the Medical Department of the Columbian, now George Washington, University. In May, 1884, he won by competitive examination the senior internship to Children's Hospital, receiving the appointment on June 1 of that year. He later succeeded to the position of acting resident physician. On September 15, 1884, he resigned to accept the appointment as assistant to the resident physician and superintendent of Garfield Memorial Hospital, thus becoming its first intern and later its second superintendent. Doors of Garfield Memorial Hospital had been opened to receive patients the first of June, 1884. Dr. Harry Madison Cutts was its first resident physician and superintendent. On January 1, 1885, following Dr. Cutts' resignation, Dr. Sprigg was appointed acting resident physician and superintendent. Authority was given him to appoint two assistants; Drs. D. Olin Leech and William Cissel were selected and entered the hospital on January 1, 1885. On March 30, 1885, Dr. Sprigg received his degree of Doctor of Medicine from the Medical Department of Columbian, now George Washington, University. On April 14, 1885, he was promoted from acting to resident physician and superintendent, retaining that position until September 15, 1889, when he resigned to enter the practice of his profession in Washington, D. C.

His first office was in the residence of the widow of Dr. F. A. Ashford, 1330 New York Avenue, N. W. Dr. Ashford's two sons, Bailey* and Mahlon,† were then small boys in short trousers. An item of interest occurred in October, 1889, when Dr. Sprigg was called to assist Dr. Henry D. Fry to do what was said to be the first successful elective cesarean section in Washington in which both mother and child survived. The operation was performed at 10 o'clock Sunday night in a third story front room on S Street, N. W., between Ninth and Tenth Streets, with all the inconveniences of 1 gas jet and 2 oil lamps, and a kitchen table. The late Dr. R. M. Ellyson administered the anesthetic. Among those present were Drs. J. Ford Thompson, Nathan S. Lincoln, W. W. Johnston and Joseph Taber

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* Recently deceased; famed as an authority on hookworm and tropical disease.

† Colonel, Medical Corps, United States Army.

Johnson. In 1890 Dr. Sprigg was appointed Physician to the Poor serving 2 years. In 1891 he was appointed lecturer on minor surgery in the Medical Department of the National University; in 1893 he was made professor of physiology. This subject he taught for 12 years when the medical school merged with the Medical Department of the George Washington University. Later he was made associate professor of obstetrics in Georgetown University, associated with Dr. Henry D. Fry, resigning after 10 years.

Dr. Sprigg was a member of the Milk Committee of the Medical Society of the District of Columbia in the "horse and buggy days." He drove into the surrounding country and visited the dairies from whence came our milk supply. The sanitary condition was deplorable. With his microscope he visited these dairies, showed them the dangerous bacteria from supposedly clean milk cans and then the difference after subjecting them to live steam or boiling. He gave much time and personal work in helping to improve our milk supply.

In 1902 he was appointed associate surgeon to Columbia Hospital for Women and 4 years later, in 1906, was made one of its surgeons in chief, which position he now occupies.

In 1887 he was 1 of 7 physicians who reorganized the Clinico-pathological Society at the suggestion of Dr. W. W. Johnston; he later served a term as president. He was one of the organizers of the American Therapeutic Society and its first secretary. At one time he was president of the old Obstetrical and Gynecological Society of Washington, which in former days took an active part in local professional affairs. He served for 6 years on the Board of Medical Examiners for the District of Columbia. He is now an Honorary Fellow of the Washington Gynecological Society.

In 1929 he was given an honorary degree of Doctor of Laws by the National University. He is author of a number of scientific articles, one of which was translated in French. Dr. Sprigg is a member of the Chevy Chase and the Metropolitan Clubs and lives at 35 Quincy Street, Chevy Chase, Md.

DIPHTHERIA SITUATION IN WASHINGTON, D. C.

Despite the fact that diphtheria is now a preventable disease the local mortality rates are quite disturbing; 560 cases of diphtheria with 20 deaths up to June, 1936, is not an auspicious start. A rate of 5.7 deaths per 100,000 population in 1935 exceeds that of 12 large cities in the United States. The areas of Washington especially affected comprise the southeast section and Georgetown. It takes the combined coöperation of the profession, the public, and all child-caring institutions to remove our territory from its present unenviable position. The duty is plain for general practitioners, pediatricians, obstetricians and all physicians, regardless of specialty, to make it known, on every examination or during history taking that diphtheria prophylaxis by toxoid or toxin antitoxin is necessary and to insist on its immediate injection or point out means at hand for its obtainment through Child Health Stations.

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

A special meeting of the Washington Society of Pathologists was called to order by the President at 7:30 P.M., June 6, 1936, at the University Club, Washington, D. C. The following members and guests were present: Drs. Wallace M. Yater, R. M. Choisser, Raymond O. Dart, R. D. Lillie, Joseph G. Pasternack, W. C. Cox, Walter Freeman, H. H. Leffler, Charles G. Aronstein, Arno Peter, W. A. L. Thompson, L. C. Milstead, H. R. Gilmore, Jr., D. C. Richtmeyer, H. A. Davis and Elbert DeCoursey.

Dr. Joseph G. Pasternack, Chairman, announced that the Nominating Committee proposed for president, **Dr. Roger M. Choisser,** and for secretary-treasurer, **Captain Elbert DeCoursey.** It was moved by **Major Raymond O. Dart,** and seconded by **Major W. C. Cox,** that the secretary cast a ballot unanimously electing the Nominating Committee's candidates. The motion was carried unanimously.

Major W. C. Cox moved that the dues of the Society be increased to $1.00 per year and that an initiation fee of $1.00 be charged for new members. After discussion **Dr. R. M. Choisser** moved that the foregoing motion be amended by deleting the initiation fee of $1.00 for new members. **Major Cox** accepted the amendment, and the motion was seconded by **Dr. Walter Freeman.** The motion was carried.

After discussion concerning the publication of the transactions of the Society and the advisability of having a stenographer to record the discussions at the meetings, it was moved by **Major Raymond O. Dart**, and seconded by **Dr. R. D. Lillie**, that a stenographer be hired to record the transactions at the meetings and to write the notices, etc., pertaining to the Society business.

Dr. Pasternack suggested that it might be more interesting if the meeting places for the Society were rotated from one medical school, hospital or government service center to another, thereby allowing each institution to show special fresh material and allow the members of the Society to become acquainted with the various institutions. **Major Dart** reviewed the history of the Society and showed that it had always maintained a neutral outlook in regard to the various institutions in Washington; similar suggestions of varying meeting places had similarly been broached but after further study had been discarded. The Army Medical Museum being in reality the National Medical Museum of the country, offers the natural and neutral meeting place for pathologists of all institutions. **Dr. Choisser** stated that it would sometimes be worth while for the meetings to be held at various institutions because of fresh specimens which could not be removed. **Dr. Freeman** opposed the idea of changing meeting places both from the standpoint of causing confusion and from the standpoint of jealousies which might arise over meetings elsewhere other than at the Museum, and suggested that not more than 1 or 2 meetings per year be held away from the base at the Museum. **Dr. Wallace M. Yater** also thought that only one meeting each year should be held away from the base.

The meeting was adjourned and the members went to a dinner in honor of **Major Raymond O. Dart, Curator of the Army Medical Museum,** who has been recently ordered to San Francisco, California, as pathologist to the Letterman General Hospital. **Dr. Wallace M. Yater** was the toastmaster. Speeches praising Major Dart and his work were made by **Drs. R. M. Choisser, R. D. Lillie, Walter Freeman, L. C. Milstead** and **Captain Elbert DeCoursey.**

THE ACADEMY OF MEDICINE, WASHINGTON

A quotation from the newly adopted Constitution makes the objectives plain: "for the advancement of the science of medicine and to promote the mutual exchange of knowledge between medical and other scientific groups." The membership is limited to 60 ordinary resident members and 30 associate and non-resident members.

The Academy of Medicine of Washington draws its membership from all medical and associated scientific groups, and will serve as a forum for exchange of ideas and discussion of problems of general interest in medical science. Washington is unique in that there are in addition to the various clinical fields, those of pharmacology, nutrition, chemistry, medical zoology, immunity and others are represented in the staffs of the National Institute of Health and the Beltsville Research Center; anthropology is represented in the staff of the National Museum; research in physics and physical chemistry is in progress at the Bureau of Standards; laboratories of the various preclinical medical sciences are found in the medical schools of the city, and in other organizations such fields are represented as army and navy medical administration, public health administration, epidemiology, parasitology, experimental medicine, national medical library administration, medical sociology, entomology, mycology and others.

In the Academy no special emphasis is placed on the degree of Doctor of Medicine. Scientists with degrees in allied branches of science are equally eligible. In this sense its membership is non-medical as well as medical.

The officers elected on April 28, 1936, were: Drs. William A. White, president; Carl Voegtlin, vice president; William C. White, treasurer; Errett C. Albritton, secretary; Aleš Hrdlička, Sterling Ruffin, Lyman J. Briggs, Earl B. McKinley and Matthew White Perry, directors.

The Medical Society of the District of Columbia, on the evening of May 6, 1936, ordered greetings sent to Washington's newest professional society. The following correspondence is of interest in demonstrating the existing cordial relationships:

April 29, 1936.

Dr. Sterling Ruffin, President,
The Medical Society of the District of Columbia,
Washington, D. C.

Dear Doctor Ruffin:

As President of the newly organized Academy of Medicine of Washington, D. C., it gives me great pleasure, as my first official act, to transmit the greetings and felicitations of the new-born society to the Medical Society of the District of Columbia.

Our Academy has been organized to include medical scientists and scientists from allied or borderline fields having a bearing on medical problems. Our interest is purely scientific and our programs will emphasize scientific discovery and discussions of wide range in the periphery of scientific learning as it influences the general field of medicine. In this sphere our interest differs from a medical society, which is engaged in more practical considerations.

Although our purpose centers about the problems of research in medical and allied sciences, where your efforts are toward the spread of the fruits of medical knowledge among those who are in immediate need, we are both concerned in bringing about the conquest of disease for the greater happiness of humanity and in this common interest we greet you.

As we set forth along the path before us we are encouraged by the distinguished career of the Medical Society of the District of Columbia, and may hope to emulate in our field of interest and service the growth in stature and achievement that has characterized your great organization in its many years of history.

Yours very sincerely,
(Signed) WM. A. WHITE
President, Academy of Medicine

May 11, 1936.

Dr. William A. White, President,
Academy of Medicine of Washington,
Saint Elizabeths Hospital,
Washington, D. C.

Dear Doctor White:

Your very kind letter of April 29, transmitting the greetings and felicitations of the Academy of Medicine of Washington to the Medical Society of the District of Columbia, was duly received. I am instructed by the Medical Society to cordially welcome the newly formed Academy of Medicine and to warmly reciprocate its sentiments of good will and friendliness.

The high purposes of the Academy must appeal to all concerned in the advancement of medical science in its broadest significance. The present state of medicine, including in addition to a very practical side a wide range of interest in research and discovery in its own and allied fields, all for the physical and mental betterment of humanity, makes the present time specially opportune for the organization of such a body as the Academy represents.

The Medical Society wishes for the Academy as complete fulfilment of its mission as is humanly possible.

Very sincerely yours,
(Signed) STERLING RUFFIN,
President,
The Medical Society of the
District of Columbia

VOLTA BUREAU

1537 Thirty-fifth Street, N. W.
Washington

Within our own community there is a nationally known organization, well equipped for combating handicaps occasioned by deafness. It is believed that the local profession should be more aware of what can be done through intelligent and well-organized effort. A type letter received frequently by the Bureau reads: "We consulted several specialists, and all of them confirmed our fears, but none offered any solution of our problem." The parents of a deaf child must be told that the child can be taught to speak and can be successfully educated, and that this education may be begun at home immediately, even if the child is not more than 2 years old. The parents of a child whose hearing is only slightly impaired must be given advice as to his adjustment. The hard of hearing adult must be told about lip reading, about hearing aids, and about social efforts in his behalf.

The Volta Bureau was established for the purpose of furnishing all this information to all who ask for it. Its services are free. Alexander Graham Bell, the son of a hard of hearing mother, the husband of a deaf wife, the lifelong friend of every one handicapped by deafness, used the money received as a prize for inventing the telephone to found the Volta Bureau so that anyone confronting the problems of deafness might be assured of help. Advice is given as to schools and preschool training, lip reading instruction, hearing aids, social contacts, and psychological difficulties. While the Volta Bureau is not equipped to do employment service, it gives information in regard to the fields of activity that are open to the deaf and the hard of hearing.

Samples of the Volta Review, a magazine for parents and teachers of the deaf and for the hard of hearing, also pamphlets dealing with all phases of deafness except medical problems are available to all who ask for them.

GEORGE WASHINGTON UNIVERSITY

SCHOOL OF MEDICINE

The following recent promotions and additions to the staff for the coming year are announced:

Promotions

Henry Lauran Darner, A.B., M.D., Associate to Clinical Professor of Obstetrics and Gynecology.
Richard Knight Thompson, D.D.S., Clinical Instructor to Associate in Dental Surgery.
John Edward Lind, M.D., Clinical Instructor to Clinical Professor of Psychiatry.

Additions

Robert J. Jermstad, A.B., B.S., M.D., Instructor in Pathology.
Luther Henry Snyder, A.B., M.D., Instructor in Physiology.
Theodore Judson Abernethy, M.D., Clinical Instructor in Medicine.
Austin B. Chinn, M.D., Clinical Instructor in Medicine.
Benjamin Rones, A.B., M.D., Clinical Instructor in Ophthalmology.
Walter Willard Boyd, M.S., M.D., Clinical Instructor in Obstetrics and Gynecology.

Harry S. Douglas, A.B., M.D., Clinical Instructor in Obstetrics and Gynecology.

Howard Pope Parker, M.D., Clinical Instructor in Obstetrics and Gynecology.

ANNUAL SCIENTIFIC ASSEMBLY

Conjointly with the Society's Annual Meeting is held a scientific assembly which yearly has proved its worth since its institution in 1929. The meetings with lectures, dry clinics and exhibits, really amount to a postgraduate course which is open to all graduates and students of approved schools without any fee whatsoever for registration or attendance. All are cordially welcomed and are looked upon as guests of the local profession. In 1937 the meetings are to be held on May 5 and 6. The comparative summary of registration* shows the increasing popularity:

YEAR	MEMBERS MEDICAL SOCIETY D. C.	M.D. GUESTS	STUDENTS	EXHIBITORS	TOTAL
1929	200	35	33		268
1930	193	30		1	224
1931	204	68		5	277
1932	261	84	6		351
1933	256	76	53	20	405
1934	294	93	8	30	425
1935	302	93	41	24	460
1936	340	103	41	17	501

* It is well known that all in attendance do not register. Actual members present estimated at 10 to 20 per cent higher than the figures.

REPRINTS RECEIVED

The following reprints have recently been received for which due acknowledgment is made:

" 'Malignant Hypertension,' A Critique, with Remarks on the Nature of Hypertension," Wallace M. Yater, M.D., Southern Medical Journal, May, 1930.

"The Nature of the Circulatory Disturbances in Hyperthyroidism (Thyrotoxicosis)," Wallace M. Yater, M.D., Virginia Medical Monthly, June, 1933.

"Non-traumatic Chylothorax and Chylopericardium; Review and Report of a Case Due to Carcinomatous Thromboangiitis Obliterans of the Thoracic Duct and Upper Great Veins," Wallace M. Yater, M.D., Annals of Internal Medicine, November, 1935.

"The Status of Focal Infection," Wallace M. Yater, M.D., International Journal of Orthodontia, Oral Surgery and Radiography, May, 1930.

"Streptococcus Hemolyticus Septicemia Cured Apparently by Intravenous Gentian Violet Therapy," Wallace M. Yater, M.D., Virginia Medical Monthly, May, 1930.

"Tuberculosis of the Ileocecal Valve—Report of an Unusual Case of Intestinal Obstruction," Wallace M. Yater, M.D., Virginia Medical Monthly, January, 1930.

"The Value of Ophthalmoscopic Examination in the Diagnosis of Systemic Diseases," Wallace M. Yater, M.D., American Journal of Ophthalmology, April, 1936.

"Acquired Heart Block with Adams-Stokes Attacks Dependent Upon a Congenital Anomaly (Persistent Ostium Primum). Report of a Case with Detailed Histopathologic Study," Wallace M. Yater, M.D., Charles W. Barrier, M.D., and Paul E. McNabb, M.D., Annals of Internal Medicine, April, 1934.

"Auriculoventricular Heart Block Due to Bilateral Bundle-branch Lesions. Report of the Literature and Report of Three Cases with Detailed Histopathologic Studies," Wallace M. Yater, M.D., Virgil H. Cornell, M.D., and Thomas A. Claytor, M.D., Archives of Internal Medicine, January, 1936.

"Bilateral Gangrene of Feet Due to Ergotamine Tartrate Used for Pruritus of Jaundice. Report of a Case Studied Arteriographically and Pathologically," Wallace M. Yater, M.D., and James A. Cahill, M.D. Journal, American Medical Association, May 9, 1936.

"Congenital Heart Block. Report of the Third Case of Complete Heart Block Studied by Serial Sections Through the Conduction System," Wallace M. Yater, M.D., William G. Leaman, M.D., and Virgil Heath Cornell, M.D., Journal, American Medical Association, May 19, 1934.

"Consumption of Blood Sugar by Muscle in the Nondiabetic and in the Diabetic State," Wallace M. Yater, M.D., J. Markowitz, M.D., and Russell F. Cahoon, B.S., Archives of Internal Medicine, May, 1933.

"Elasticity (Extensibility) of the Aorta of Human Beings," Wallace M. Yater, M.D., and Ivar W. Birkeland, M.D., American Heart Journal, August, 1930.

"Heart Block Due to Calcareous Lesions of the Bundle of His. Review and Report of a Case with Detailed Histopathologic Study," Wallace M. Yater, M.D., and Virgil H. Cornell, M.D., Annals of Internal Medicine, January, 1935.

"Lipoma of the Mediastinum," Wallace M. Yater, M.D., and E. Stuart Lyddane, M.D., American Journal of the Medical Sciences, July, 1930.

"The Pathology of Sickle-cell Anemia. Report of a Case with Death During an 'Abdominal Crisis,' " Wallace M. Yater, M.D., and Mario Mollari, M.D., Journal, American Medical Association, May 16, 1931.

"Sickle-cell Anemia: A New Cause of Cor Pulmonale. Report of Two Cases with Numerous Disseminated Occlusions of the Small Pulmonary Arteries," Wallace M. Yater, M.D. and George H. Hansmann, M.D., American Journal of the Medical Sciences, April, 1936.

Unusual Case of Meningococcus Septicemia," J. Lawn Thompson, M.D., Virginia Medical Monthly, July, 1936.

"The Pupillary Reactions in Combined Lesions of the Posterior Commissure and of the Pupillodilator Tracts. A Contribution to the Pathogenesis of the Argyll Robertson Pupil," Norman P. Scala, M.D., and Ernest A. Spiegel, M.D., Archives of Ophthalmology, February, 1936.

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THE ADMINISTRATION OF DIGITALIS*

LEWIS C. ECKER, M.D.
Associate Professor of Clinical Medicine, Georgetown University School of Medicine

The first practical discussion of the nature and use of digitalis was made in 1785 by Withering in his historical book, "An Account of the Foxglove and Some of its Medicinal Uses." In this, he explains how his interest in the drug began. He says, "My opinion was asked concerning a family recipe for the cure of dropsy; . . . it was not very difficult . . . to perceive that the active herb could be no other than the Foxglove." And in the preface he writes, "The use of the Foxglove is getting abroad, and it is better the world should derive some instruction, however imperfect, from my experience. . . . It is now about 10 years since I first began to use this medicine. After all, in spite of opinion, prejudice, or error, time will fix the real value upon this discovery." He presented notes on 163 cases of dropsy in which digitalis was given and describes the method of collecting and preparing and administering the drug.

Christian and Pratt have reviewed the various works on heart disease, at least in England and America, and they found that Withering's splendid work was practically unnoticed for more than a century. Christian quotes from the notes taken by a medical student at a lecture delivered by James Jackson in 1815. He, alone, was not only advising that the drug should be given in increasing doses until "some effects are produced," but was so modern as to prescribe it in powdered leaf. Sir James Mackenzie, however, was the first clinician to demonstrate conclusively the correctness of Withering's instructions regarding the administration of digitalis.

Digitalis purpurea is the species almost universally used, and until the War, it was imported chiefly from Germany, Austria and England. At the outbreak of the European War, a shortage in the supply was first felt, and this increased rapidly. Wilbert called attention to wild-growing digitalis in various sections of the United States. Roth investigated this crude supply and in his report concluded that the wild digitalis could be cultivated and that by using ordinary methods of handling and preparing the leaves a highly active product could be grown. We now know that the best American digitalis is equal in activity to the best European digitalis.

Following Mackenzie's investigation in 1911, the most important advances were made in the question of dosage and standardization. A number of methods for the biological standardization of digitalis have been employed. The one considered most satisfactory is the cat method of Hatcher and Brody. (The cat unit may be defined as that amount of the drug which is just sufficient to kill 1 kilogram of cat when slowly and continuously injected into the vein. This is expressed in terms of milligrams of the drug, whether it be a pure principle or the leaf.)

Eggleston found that when he digitalized a group of patients with a number of digitalis preparations of different cat-unit strengths, the doses proved to be most uniform when expressed in terms of cat units per pound of body weight. He did not state that this method would yield the exact dose for any single individual. He showed, as many others also have seen, that there are marked variations in the doses for different patients, but that the range of variation was wider when the doses were expressed as total quantity per patient than when expressed as cat unit per pound of body weight. Others have confirmed the relationship between total dosage, the body weight of patients, and the biological activity of different specimens of digitalis. The principle that body weight and dosage are related simply expresses the idea that a very small man will require less digitalis than a very large man to produce a given effect, other conditions being the same (Wyckoff, Gold and Travell). This merely places a limitation on the value of the weight factor, since there are many variables to be dealt with in the treatment of heart disease, among which body weight is only one. For example, the average ambulatory cardiac patient usually does not require the same degree of digitalization found necessary for the average patient in acute congestive heart failure; and even though these two patients may be of the same weight, a difference in their degree of failure may make it necessary to give one much larger doses of digitalis than the other.

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* Read at the joint meeting of the Washington Heart Association and the Society, March 18, 1936.

More important than the weight is the biological activity of digitalis. From all facts at present available, it would be sound to assume that if one specimen of digitalis is twice as active as another when it is brought into contact with the cat's heart at a given rate, the same relative activity between the two would be present in man under similar conditions (Wyckoff, Gold and Travell). But since the drug is usually given by mouth in man, the factors of absorption and elimination complicate the determinations of the relative activities of any two preparations. This simply places a theoretical limitation on the value of bio-assay by the cat method and makes it necessary to bear in mind that if one specimen is twice as active as another by intravenous injection into the cat, it may not necessarily be twice as active by oral administration in man. In actual practice, barring occasional specimens of digitalis poorly absorbed, one finds that preparations with significant differences in biological activity by the cat method reveal these differences when used in man, if suitable conditions are present to detect them.

It is perfectly clear that digitalis is a drug which must be given under careful supervision. The physician must know at all times the exact amount that his patient is taking. The dose of digitalis varies in different hands. The fear of the supposed dangers of cumulative action has often reduced the dose to a point at which no effects are obtained (Cushny). It cannot be stated too strongly that these apprehensions are unfounded. Any patient taking digitalis should be watched for nausea and vomiting and for marked slowing of the pulse. If the treatment is stopped when any of these appear, no harm results, the symptoms disappear in 2 or 3 days, and the treatment may be resumed with smaller doses. Withering's rule still holds good: "Let the drug be continued until it either acts on the kidneys, the stomach, the pulse, or the bowels; let it be stopped upon the first appearance of any one of these effects, and I will maintain that the patient will not suffer from its exhibition." Mackenzie found that when a drachm of the tincture was given daily, the adequate concentration was reached after 5 to 8 drachms. This gradual increase in the concentration by successive doses, of which some remains in the tissues from each dose, is that generally aimed at, and, provided there is no urgency, is a satisfactory method. Eggleston has shown that there is no reason to await the gradual accumulation by moderate doses, the results of these to appear only after several days. Absorption of digitalis is usually nearly complete within 2 hours after its oral or rectal administration, at any rate after 6 hours. Eggleston introduced the treatment with 1 large dose, approximately half the quantity which might be expected to be efficient, followed by further doses at intervals of 6 hours, which brought the total dosage up to the requisite quantity. In this way, the interval before improvement sets in may be reduced to 12 hours or even less. In the method advised by Mackenzie, the tincture was given in 15-minim (1 cc.) doses 4 times a day, or 20 minims (1.3 cc.) 3 times a day until definite effects were obtained in the heart or until nausea and other symptoms developed. It was then stopped for 2 or 3 days and then continued in 10-minim (0.6 cc.) doses 4 times a day.

In the Eggleston method the total dose is determined on the basis of the patient's actual or estimated weight and the cat unit strength. He suggested the following formula, using 0.15 of 1 cat unit per pound of body weight: Formula I—$\frac{\text{C. U.} \times 0.15 \times \text{W}}{1000}$ = Gm. powdered leaf in total amount. For example: If a patient weighs 150 pounds and the digitalis available has an activity of 100 mg. to the cat unit, by Formula I, $100 \times 0.15 \times 150 \div 1000 = 2.25$ Gms.

Eggleston's work popularized the large dose method of administering digitalis and served as a general guide for digitalization. (The term was coined to signify the full pharmacologic action of digitalis.)

Various studies have shown that the desired amount of digitalis necessary in any case can be estimated only roughly. In general, an average adult (125 to 175 pounds) who has not recently had digitalis will need about 30 grains (2.0 Gm.) in the course of several days, in order to become digitalized. Some will need less and some more. Because of the variability, the drug is given in divided doses until the desired effect is produced. Unless there is need for great haste, 1 pill of $1\frac{1}{2}$ grains (0.1 Gm.) can be given 4 times a day for 4 to 6 days and then followed by a maintenance dose of about $1\frac{1}{2}$ grains (0.1 Gm.) daily.

When there is pressing need, it can be given by the rapid method—0.5 Gm. ($7\frac{1}{2}$ gr.) every 8 hours for 3 doses (White). Overweight patients need more of the drug than indicated above, and those underweight need less. A satisfactory rule for roughly determining the dose is 0.1 gram ($1\frac{1}{2}$ gr.) of the leaf per 10 pounds of body weight, plus an additional 0.1 gram ($1\frac{1}{2}$ gr.) for each day required to introduce the total dosage. While this rule is of great help, it is important to remember that each case must be treated on its merits, and some patients need more and others need less than is anticipated.

The importance of continuing the effect of the digitalis after the emergency is passed has not received the attention it deserves until recent years. With the proper use of digitalis in maintaining digitalization, many patients will continue for 3 or 4 years without attacks of failure. After a patient is satisfactorily digitalized and without toxic symptoms, daily rations of small amounts of the drug should be prescribed and continued indefinitely. It is usually found that 0.1 Gm. ($1\frac{1}{2}$ gr.) of the powdered leaf is sufficient. Patients frequently can aid in determining the most satisfactory daily dose.

A digitalis preparation should be used intravenously only in those cases in which it is imperative that the therapeutic effects shall be induced within 2 hours or less; that is, within less time than they can be induced with a fair degree of certainty by oral or rectal administration (Robinson, et al.).

The selection of the kind of digitalis to be used is a matter of some confusion. Formerly, the liquid preparations were most commonly used. Recently, as a result of the recommendations of the Digitalis Committee of the American Heart Association, preparations of powdered whole leaf in tablet, capsule, or pill form have been more generally used (Bulletin, American Heart Association, May, 1930). When taking a pill or tablet, the exact amount of the drug is known, while the tincture must be measured accurately and mistakes are not infrequent.

"After careful consideration, the American Heart Association recommends the following 3 resolutions:

1. That capsules or tablets of powdered digitalis leaves be dispensed in all cases where digitalis is indicated, except in emergencies.

2. That such digitalis preparation be standardized by a recognized method of biological assay, such as the cat or frog, for biological

potency, but that efforts be made to secure uniformity of activity, so far as possible, by adhering to one of these methods of standardization.

3. That the digitalis be further standardized for its absorbability and efficacy by administration to selected patients suffering with auricular fibrillation."

Consideration of the indications for digitalis will now be briefly discussed. Auricular fibrillation seems the one condition in which there is general agreement that digitalis is indicated, but it is also used almost universally in the treatment of congestive failure with regular rhythm. The use of digitalis seems justified when any symptoms or group of symptoms are present which can be accounted for by no other causes than myocardial insufficiency (Robinson, et al.). White states that there is no contraindication to the use of digitalis when it is needed except the very rare Adams-Stokes syndrome in high grade heart block and the very rare individual hypersensitivity to the drug activity.

As a general rule, digitalis should not be given to patients with acute disturbances of the myocardium (Harrison). In coronary occlusion, it may produce ventricular tachycardia and so should be withheld unless the signs of congestive failure warrant its use. Also, in acute heart disturbances of diphtheritic or rheumatic origin, it is not as a rule helpful and should not be given unless the patient develops either signs of congestive failure or gallop rhythm. It is of no value in shock or peripheral circulatory failure, and in fact may be harmful.

BIBLIOGRAPHY

Christian, H. A.: James Jackson (1815) and Digitalis; Historical Note. New England J. Med., 1935, **212**, 54.

Cushny, A. R.: The Action and Uses in Medicine of Digitalis and Its Allies. New York, Longmans, 1925, p. 258.

Eggleston, C.: Digitalis Dosage. Arch. Int. Med., 1915, **16**, 1.

Harrison, T. R.: Failure of the Circulation. Baltimore, Williams & Wilkins, 1935.

Hatcher, R. A., and Brody, J. G.: The Biological Standardization of Drugs. Am. J. Pharm., 1910, **82**, 360.

Mackenzie, J.: A Case of Angina Pectoris Associated with Great Excitability of the Vaso-constrictor Mechanism. Heart, 1910–1911, **2**, 273.

Pratt, J. H.: Digitalis Therapy. J. A. M. A., 1918, **71**, 618.

Robinson, G. C., White, P. D., Eggleston, C., and Hatcher, R. A.: The Therapeutic Use of Digitalis; With Especial Reference to its Intravenous Injection. J. A. M. A., 1924, **83**, 504.

Roth, G. B.: The Activity of Wild American Digitalis. Pub. Health Rep., 1917, **32**, 377.

White, P. D.: Heart Disease. New York, Macmillan, 1931, pp. 579, 581.

Wilbert, M. I.: The Source and Supply of Medicine with Special Reference to the Interference Caused by the Existing European War. Pub. Health Rep., 1914, **29**, 2,715.

Withering, W.: An Account of the Foxglove and Some of its Medicinal Uses; With Practical Remarks on Dropsy and other Diseases. Birmingham, Robinson, 1785.

Wyckoff, J., Gold, H., and Travell, J. G.: Importance of Differences in Potency of Digitalis in Clinical Practice. Am. Heart J., 1930, **5**, 401.

Encephalitis Virus (St. Louis Type). Effect of Partial Specific Immunity Upon the Clinico-Pathologic Picture in Intracerebrally Inoculated White Mice.—When normal white mice are inoculated, either intranasally or intracerebrally, with encephalitis virus (St. Louis type), the resulting clinico-pathologic picture usually is predominantly that of an encephalitis. The animals become listless and tremulous, are prone to sit on their hindquarters, rub their noses, and fall over backward. Others may be irritable and jump blindly, or run rapidly about the cage. Later, the front legs and neck usually lose the power of voluntary motion and the animal lies on its side, often making scratching or running movements with the hind legs. This stage tends to pass more or less rapidly to one of quietude with infrequent breathing, which may persist for a day or more. If the animal is stimulated, more or less vigorous movements of the legs and tail will usually result, indicating that the cord motor neurons are still capable of transmitting an impulse.

This clinical picture is in accordance with the predominantly cerebral localization of the lesions, as noted by Webster and Clow, and Lillie, and is especially understandable in the light of the virus distribution studies of the former. These authors have traced the posterior progression and multiplication of intranasally inoculated virus in mice from the olfactory lobes, where it was present after 24 hours, through the brain to the cord, which was reached only after an interval of about 4 days. Thus the brain is subject to earlier and more prolonged exposure to the virus, and one might expect the symptoms (which usually appear in from 4 to 7 days) to point predominantly toward a cerebral localization, as is the case.

The authors wish to record here the fact that, when the same virus is intracerebrally introduced, in proper concentration, into partially immune mice, a clinico-pathologic picture pointing to a predominant involvement of the cord, usually of the lumbar region, may result....

Summary: 1. Normal mice, when intracerebrally inoculated with the St. Louis type of encephalitis virus, usually developed a clinico-pathologic picture pointing predominantly to a brain localization.

2. Partially immune mice, when intracerebrally reinoculated, after a suitable interval, with a proper dose of virus, tended to develop symptoms and pathology pointing predominantly toward a cord localization. The pathology is that of a destructive inflammation of the gray substance.

3. We have failed to produce the predominantly myelitic symptoms when the second inoculation was made by the intranasal route.

4. The paralyses may be permanent or undergo variable to apparently complete recovery.

5. The above observations are probably best explained by assuming that cord cells of mice are relatively more susceptible to the virus of encephalitis than are the brain cells and therefore require a higher degree of immunity to afford protection when once the cord is reached by the virus. The possibility of a difference in response by brain and cord cells to active immunization cannot, however, be ruled out.

Extract from article by Charles Armstrong and R. D. Lillie, Surgeons, United States Public Health Service, National Institute of Health, ***Public Health Reports, August 7, 1936, p. 1,069.***

THE ACTION OF DIGITALIS IN CONGESTIVE HEART FAILURE*

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Out of a welter of confusion, both in terminology and in the interpretation of experimental data, there has developed within recent years a better understanding of the mechanisms of congestive failure and the mode of action by which digitalis alters those mechanisms for the good of the patient. Confusion in terminology is emphasized because concepts such as work, strain, hypertrophy, dilatation, compensated heart action, decompensation—all have been used loosely without attempt at clear-cut definition. Erroneous conclusions have been drawn from both sound and unsound data. Although not the primary purpose of this paper, justification for these criticisms will develop, we hope, as we progress.

Let us first consider the three distinct and generally mutually contradictory theories concerning the mechanisms of congestive failure that have held sway at one time or another during the past 100 years. One hypothesis, that designated as "forward failure," holds that symptoms develop because the heart fails to deliver an adequate amount of blood to the tissues. This theory is not tenable because it can definitely be shown that congestive failure is not uniformly associated with a decrease in cardiac output per unit of time and that improvement need not be associated with an increase in that function. A second theory is that symptoms of failure are due to "ventricular imbalance," which postulates a preponderance in output of one ventricular chamber over the other, leading either to systemic or pulmonic congestion. Such a discrepancy in output by the two chambers undoubtedly plays a rôle in some instances, particularly in the acute pulmonic congestions, but most certainly does not play the sole rôle in failure. A compelling argument against it is the fact that, in the average case, systemic and pulmonic congestions develop *pari passu* and improve synchronously with treatment.

A third hypothesis, and one that finds most support, is the "backward failure" idea. In the light of modern confirmation, this theory holds that there are two essential mechanical factors involved: first, dilatation of one or another chamber, and, secondly, the consequent engorgement of tissues on the venous side of the dilated chamber. The historical background of this third hypothesis, the one which has always been favored by pathologists, is interesting in that it was the first to be clearly expounded. Corvisart, the physician to Napoleon, initiated the idea when he said "the difficulty of respiration appears to belong solely to the accumulation of blood in the vascular system of the lungs, from the embarrassment which it suffers on returning into the cavities of the heart." However, to James Hope (1842) goes the credit for giving the clearest expression of many phases of the theory of "backward pressure failure." Most significant in the light of what has followed in the study of heart failure since his time is his statement: "Permanent patescence of the mitral orifice, therefore, constitutes an obstruction on the left side of the heart, and the effect of this, as of contraction of the orifice, may be propagated backwards to the right side."

Before anything can be said about digitalis action it is necessary to expound the ideas of James Hope and produce satisfactory proof that they are substantially correct in the light of modern findings. This leads to a consideration of dilatation, its definition and purposes, hypertrophy, its true meaning and function, cardiac fatigue, the effects of tachycardia, the mechanism of dyspnea and certain other factors involved in systemic congestion. From such a consideration it may be possible to arrive at a concept which will tersely express the meaning of failure and, by the same token, illuminate the mode of digitalis action.

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* Read at the joint meeting of the Washington Heart Association and the Society, March 18, 1936.

Full acceptance of this "backward pressure" hypothesis depends upon the demonstration, either by direct observation, or by inference from relevant data, of a certain train of events accompanying failure of the heart. They are, in order of their occurrence, a temporary decrease in left ventricular output, dilatation of the left ventricle, an increase in left auricular pressure, an increase in pulmonary vascular pressure and in lung blood volume, and increased rigidity of pulmonary tissue, with resultant decrease in vital capacity, a slowing of blood velocity through the lungs, hypertrophy and dilatation of the right ventricle due to increased pulmonary pressure and, finally, an increase in total blood volume to the extent of that stagnating in the lungs. Of great importance to the validity of this theory is the fact that it can be definitely shown that diminution in pulmonary circulation time, or velocity, and diminution in vital capacity definitely precede the increase in systemic venous pressure. Of equal importance, too, is the finding that decrease in these two functions occurs much earlier in rheumatic mitral disease than in hypertensive disease. In the former, increase in pulmonary vascular pressure can be expected to develop early; in the latter, it is not until the left ventricle fails that there is any appreciable increase in pulmonary congestion. Regarding the increase in blood volume demanded by the "backward pressure" theory, suffice it to say that the best evidence we have points definitely to an increase in blood volume in congestive failure. Inasmuch as marked systemic congestion is practically always related in a causal way to an increase in systemic venous pressure, and inasmuch as the existence of pulmonary congestion in failure cannot be denied, it is reasonable to assume that increased venous pressure in the lesser circulation accompanies such congestion, although it has never been directly measured.

It is necessary now to produce evidence that lends support to the contention, as required by James Hope's theory, that the primary mechanical change in congestive failure is cardiac dilatation. The temporary decrease in left ventricular output that initiates the train of events mentioned is not susceptible to proof but must be assumed by inference from the aggregate validity of the other data. It is generally accepted, although not always susceptible to actual proof because of limitations imposed by the deficiency in available methods for accurate determination of heart size, that congestive failure is not encountered in the absence of cardiac dilatation. This statement is true in all instances except in the case of constrictive pericardial disease. The three processes, hypertrophy, dilatation and heart muscle fatigue, must be considered simultaneously because they are directly related to the required increased ventricular diastolic volume which almost invariably exists in failure. It now seems clear that hypertrophy may not be a disease of heart muscle but is rather a natural response to what usually amounts to chronic long-standing overloading. A mass of evidence points to the truth of this statement; conflicting evidence can be reconciled to it, and exceptions are uncommon. The old idea that hypertrophy is essentially a beneficent process and dilatation essentially an evil one can no longer be entertained seriously. It is now settled that both processes are mechanisms designed by nature to handle effectively increases in strain, whether arising from increases in pressure from behind or the necessity of caring for an increase in load ahead. Viewed in the simplest way, cardiac muscle follows laws of contraction similar to those applying to skeletal muscle, which show clearly that within limits the strength of a muscle in contracting has a definite proportional relationship to initial length; also, that an hypertrophied muscle requires a shorter initial length for a given blow than does a flabby one. By the same token, heart muscle within certain limits is more effective in dilatation and more effective when hypertrophied. That the normal heart responds to excessive loads by dilatation cannot be proved, but the fact that X-ray studies following severe and prolonged exercise shows diminution in heart size, or no change at all, rather than increase, does not constitute conclusive proof that such dilatation does not occur. In the first place, no X-ray studies during exercise are available. In the second place, were they available, as ordinarily conducted, they would not register changes in more than two dimensions and because of the three-dimensional form of the heart even small increases in plane surface radii, insignificant themselves, would be squared in figuring volume, the true measure of the presence or absence of dilatation.

Although direct evidence for dilatation as a normal process of adjustment is not available in either the normal or failing human heart, there is a body of rather compelling data derived from studies on heart-lung preparations. This phase of the subject is so important that it warrants elaboration. Twenty years ago, after working with such preparations, Starling announced his "Law of the Heart" as follows: "The law of the heart is, therefore, the same as that of skeletal muscle, namely, that the mechanical energy set free in passing from the resting to the contracted state depends on the area of chemically active surfaces"; i.e., on the length of the muscle fibers. Expressed another way, dilatation promotes oxygen utilization. Using the heart-lung preparation, it is possible to control essential functions, namely, rate, peripheral resistance and venous pressure, and, coincidentally, to measure the physical volume and the volume output of the heart. Experiments can be devised to show that increase in peripheral resistance will diminish the volume output for a few beats when residual blood accumulates and dilates the heart, but that this early phase is soon superseded by a return to normal output with a dilated heart in the face of increased resistance. Such a result would seem to demonstrate in a simple way that a dilated heart in contracting is capable of setting free more mechanical energy than when in the normal state. It can likewise be shown by this method that increasing venous pressure leads to dilatation and increased systolic output. Furthermore, in experimental failure it can be proved that a given cardiac output can be maintained in the face of increasing venous pressure only by increasing dilatation, an effect which ultimately is entirely abolished when the purely physical advantage of stretching is no longer operative. Dilatation not only tends to increase heart muscle power but also definitely facilitates the utilization of oxygen. This latter effect, however, is an adverse one, indicating as it does that although the dilated heart is capable of delivering more mechanical energy, it does so at the expense of a relatively greater amount of oxygen. In other words, the dilated heart is an inefficient heart so far as fuel consumption is concerned. The corollary to this is that anything which causes the heart to work with lessened volume, that is, decreased dilatation, promotes the efficiency of the heart, an effect which is important in the consideration of digitalis action. Likewise, anything which tends to slow the heart rate, as does digitalis, has the effect of promoting cardiac efficiency, since with the heart-lung preparation it can be shown that the consumption of oxygen, other things being equal, is less at lower rates.

These facts lack corroboration in studies on man, but it is interesting that Harrison and his co-workers have brought a measure of additional proof, as yet unconfirmed, in that a study of intact animals with experimental failure showed loss of cardiac efficiency. Their procedure required the ingenuity of actually securing for study samples of coronary sinus blood. This they accomplished by passing a cannula into the coronary sinus of the dog by way of the superior vena cava. It seems clear, then, that dilatation occurs early in heart failure and functions as an inefficient mechanism of adjustment.

Researches in cardiac physiology have been concerned with the determination of the primary causes of failure, or, expressed another way, the nature of the process that initiates persistent dilatation. There is some question as to whether, after all, that process is founded on heart muscle disease or whether disease in a pathological sense may not, after all, be contributory only, and that the important change may not be altered function. The final answer cannot be given, but Starling's conception of fatigue of heart muscle seems to bring us nearer a solution. That author's investigations suggest that a fatigued heart maintains a given output only when it dilates, and that the essential difference between the fatigued healthy heart and the fatigued diseased heart is that the latter fails to return to its normal size in the performance of an increased amount of work. Important in this connection is the fatiguing effect of tachycardia. The development of congestive failure during an attack of auricular tachycardia in young individuals with otherwise normal hearts shows clearly that increase in rates alone can cause a heart to fail. The reason for this is twofold: In the first place, increase in rate causes a disproportionate use of oxygen for a given amount of work; furthermore, with rapid rates diastole is shortened disproportionately so that physiologic recovery of the muscle is interfered with. Both of these factors lead to fatigue, interfering as they do with proper oxygen supply for metabolic needs. An additional consideration in the question of fatigue and one of equal importance is heart muscle fiber thickness or the degree of hypertrophy which, in large measure, governs metabolic processes. The hearts of small animals have small fibers and function well despite exceedingly fast rates. Those of larger animals with slow rates have muscle fibers the thickness of which is roughly proportional to their normal rates. The fibers of hypertrophied human hearts are greatly thickened in proportion to the rates they maintain and for this reason are handicapped as to their proper metabolism. This fact may be a partial explanation, at least, for the fact that an hypertrophied ventricle beating at a slow rate with normal rhythm may suddenly fatigue and fail at a rate of 130 with the irregular rhythm of auricular fibrillation. From such ideas as these, on theoretical grounds, it can be adduced that hypertrophied hearts require very low rates and consequent long diastoles for recovery and that the ideal drug for failure would be one that combined the muscle effects of digitalis with a superior slowing effect.

So much for fundamental considerations of the mechanisms of failure. What of the genesis of the outstanding symptoms, dyspnea and edema? Dyspnea, although subjective in nature, is based on objective and to a considerable extent measurable changes. The symptom becomes manifest both subjectively and objectively when a patient's effort requires more air in a given length of time than his vital capacity can deliver. Although both the requirement and the capacity to satisfy it are of importance in the production of the symptom, it is clear that the fundamental change is diminished capacity and this, in turn, is an expression of pulmonary congestion or "backward pressure" in the pulmonary circuit. So far as the edema of congestive failure is concerned, suffice it to say that it is generally accepted that the chief factor concerned is increased venous pressure in the systemic circulation, although in many cases there are contributory mechanisms in operation.

At this point, before discussing the mode of digitalis action, it might be well, if not indispensable, to take stock of what has gone before and summarize in the following dogmatic way:

1. The backward pressure theory of James Hope is the most acceptable one of the three thus far offered.

2. The physiologic response of both the normal and the abnormal heart chamber to increased pressure is one of dilatation. The dilated chamber, within limits and in accordance with the laws of muscle contraction, is capable of performing more work than when in a normal state. Furthermore, it is capable by reason of greater exposed muscle fiber surface of utilizing a greater amount of oxygen. The dilating mechanism, however, operates only by utilizing a disproportionate amount of oxygen and is, therefore, an inefficient one. The dilated diseased heart in contradistinction to the dilated normal heart may fail to return to normal size in caring for increased circulation requirements, largely because of failure in the supply of its increased need for metabolites. In brief, when the account is balanced, the dilated heart is found to be an inefficient heart.

3. Hypertrophy, as a second mode of adaptation to increased load, is a beneficent process insofar as it enables the heart to deliver a stronger stroke; an evil process insofar as it interferes by reason of increased fiber diameter with heart muscle metabolism.

4. Heart failure begins when heart muscle is

fatigued and heart muscle is fatigued when, in order to maintain a given output, it can only do so by remaining permanently dilated.

5. The fatiguing effect of tachycardia is readily understood and hearts that are normal can be fatigued by increased rates.

6. The outstanding symptoms of congestive failure, dyspnea and edema, are fundamentally expressions of increased venous pressure, pulmonary or systemic, as the case may be.

We may now approach more intelligently the question of the alterations in circulatory dynamics produced by digitalis when it improves the patient with congestive failure. This question may be considered under the following headings: Effects on conduction, effects on blood volume, effects on heart size, and effects on venous pressure. Slowing of the heart rate either by vagus action or by direct action of the auriculoventricular node is of mechanical advantage to the ventricles because more complete emptying and more complete recovery are promoted and because energy is more economically used. This is most strikingly exhibited in the rapid fibrillators with large pulse deficits, but that the benefit is not entirely due to the slowing of the heart rate is proved by the fact that equally brilliant results are often achieved in patients in failure who have auricular fibrillation whose rates are slow without deficit. With respect to cardiac output it may be said that, with few exceptions, there is no consistent change in this function coincident with the disappearance of congestive manifestations. This statement conflicts sharply with views held until recently. As to changes in blood volume, it may be said that although they are not of primary importance, what is known is that digitalis tends to reduce the quantity of circulating blood. This should be expected if the backward pressure theory of failure is tenable. Results of studies of the effect of digitalis on peripheral venous pressure are conflicting. Although no one has reported an increase in this function, a decrease has not been found. Such a consistent decrease, of course, would conform to the requirements of the "backward pressure" theory. We come finally to a consideration of the effect on heart size and here we find complete agreement that the one constant change noted in the digitalized heart, regardless of the state of the circulation at the time of administration, is a distinct, measurable diminution in size. Furthermore, clinical improvement is invariably associated with decrease in size. Likewise, congestive failure is invariably accompanied by dilatation. This triad of facts makes it likely that the one important mechanical effect of digitalis is to decrease dilatation. By decreasing dilatation, pressure back of the chamber is progressively diminished until "backward pressure" symptoms disappear. Inasmuch as failure is associated with dilatation and inasmuch as the dilated heart is inefficient in that its oxygen requirements are disproportionately large, it may be said in conclusion that digitalis, by decreasing heart size, improves the circulation by making the heart beat more efficiently. This is its real *modus operandi.*

In the above discussion I have attempted to present a viewpoint which is substantially that of Tinsley Randolph Harrison, Associate Professor of Medicine, Vanderbilt University School of Medicine. The subject has been developed in great detail by Dr. Harrison in his recent book, "Failure of the Circulation," published in 1935 by the Williams and Wilkins Company, Baltimore, Maryland.

Mortality Experience of the First Six Months of 1936.—Such early figures as are available on the comparative mortality in the general population of the United States during the first half of 1936 and 1935 strongly indicate that there has been a considerable increase in the Nation's death rate this year. In contrast, complete figures for the half-year for an important cross section of the population (the 17,000,000 industrial policyholders of the Metropolitan Life Insurance Company) show that there is substantially no difference between the death rate of the current year, to date, and that of the first half of 1935, when a new low record for mortality was established for these millions of insured wage-earners and their dependents. . . .

Diabetes.—A slightly upward tendency still prevails in the death rate for diabetes. The small increase recorded in this six-month period, however, probably is not significant and may simply reflect changes in the age and sex composition of this insured population. The diabetes death rate, nevertheless, is higher than it should be. Preventable deaths from coma and gangrene still occur in large numbers. These, and other complications of the disease, are due in large measure to the failure of many patients to use insulin although they really need it. Possibly the new protamine insulin, which is being tested in several medical centers, will make the use of insulin more popular among diabetics because, in addition to other advantages, it reduces the number of injections that are required each day. . . .

Suicides Still Declining.—The fact that the suicide death rate continues to decline among insured wage-earners is particularly gratifying. In 1932 it reached the highest point recorded since 1915. Nineteen thirty-three, however, was featured by the considerable drop of 5.7 per cent; and further declines, registered in 1934 and 1935, reduced it to 9.2 per 100,000—a lower figure than was recorded for the first year of the depression, 1930. The suicide rate for the first half of 1936 was 8.9; and if this prevails at the end of the year, it will mark a drop of more than 16 per cent, or substantially one sixth in the brief space of 4 years.

Extract from Statistical Bulletin, Metropolitan Life Insurance Company, July, 1936, p. 4.

CLINICAL APPLICATION OF VENOUS PRESSURE MEASUREMENT*

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The work of many men, notably of Eyster in this country and of Villaret in France, has demonstrated that the measurement of the blood pressure in the peripheral veins is a useful test of the state of the circulation. Such measurement has its best application in the diagnosis and study of congestive heart failure, but there are other conditions in which it is valuable. Of course, no one test, such as measurement of venous pressure, vital capacity, circulation rate, or cardiac output, is alone a means of determining the state of cardiac hemodynamics. However, venous pressure measurement is the simplest reliable test and, in general, the one which yields the most information. It is the test above others which can be used in the general practice of medicine.

There are three principal methods of venous pressure determination. The one to which Gärtner's name is attached undoubtedly was used long before he described it in the literature. It consists in raising the relaxed arm of the patient above his supine body and observing the distance to which the hand must be carried above the cardiac level before the peripheral veins collapse. This method has certain disadvantages, including the facts that it is inaccurate, that the peripheral veins sometimes remain distended because of their rigidity rather than the presence of the blood within them, and that there are many cases in which peripheral venous blood pressure is high but no peripheral veins are visible. Its main advantage is its simplicity.

The direct method of measurement consists in the introduction of a needle into one of the veins of the antecubital fossa, while the patient is supine, and observing the height to which blood from the vein rises in a calibrated glass tube connected to the needle. A refinement of this method was used in my studies. It has the following disadvantages: (1) Blood may clot in the needle; (2) most patients object to the too frequent use of the method because of the pain incident to the introduction of the needle; (3) a vein suitable for venipuncture may not be present. These disadvantages, except the second, are mainly theoretical in the majority of cases, and they are greatly overbalanced by the advantages of the procedure. It is accurate, easy to learn, and requires no special skill in its performance. It can be combined with other procedures requiring venipuncture, such as the withdrawal of blood for laboratory tests and the introduction of medications. It involves the use of apparatus which is inexpensive, easily prepared for use in any situation, and readily stored in the physician's kit.

The indirect method of venous pressure estimation is that which measures the pressure necessary to collapse one of the peripheral veins or to prevent its filling, with the patient in a standard posture. This method necessitates the use of a more complicated and expensive apparatus, is more difficult to execute skilfully and accurately, and cannot be used when the peripheral veins are invisible or already collapsed. Its superiority over other methods rests in the fact that it can be used frequently on the same patient without causing discomfort.

Method Employed

In my studies a method and an apparatus devised by Griffith, Chamberlain and Kitchell was used. The apparatus consists of a 20-gauge needle and a 2 cc. syringe having a sidearm to which a calibrated glass measuring tube is connected by means of rubber tubing of about the size of a 14 F. catheter. The other end of the glass tube is connected by means of another short piece of rubber tubing to a glass reservoir of any description. The entire apparatus can be sterilized by boiling. Physiologic salt solution is placed in the reservoir and allowed to fill the set, which is then ready to use. The patient is placed in supine position, a vein is selected in one of the antecubital fossae, and the needle of the apparatus is introduced into the vein following the usual technic for intravenous medication. The plunger of the syringe is drawn back allowing saline to run through the sidearm into the syringe and thence into the vein. Next, the reservoir is detached from the apparatus, and the zero point of the calibrated tube is placed on a plane with the midaxillary line of the patient. This plane has been selected arbitrarily as approximately level with the right atrium of the heart and as a simple means of standardization of readings. The saline will continue to fall in the glass tube, fluctuating somewhat with respiration, and stopping at a point which indicates the height of the venous blood pressure in terms of millimeters of saline. Using this technic it has been found that normal persons have a peripheral venous blood pressure of 40 to 120 mm. of saline. The reasons for this wide normal variation will be discussed later.

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* Read before the Annual Scientific Assembly of the Society, May 7, 1936.

Venous Pressure Regulation

The principal factors influencing the blood pressure in the peripheral veins of a normal individual are the heart action, gravity, the intrathoracic pressure, the blood volume, and muscular exercise. Factors of less influence are the aspirating effect of cardiac systole, the state of body nutrition, and the time of day.

Heart Action. No comment is necessary on the fact that the momentum of the blood in the peripheral veins and, therefore, the venous pressure is dependent to some extent on the propulsive action of the heart and large arteries. It is interesting, however, that the degree of force of this action as measured by the arterial blood pressure has little or no influence on venous pressure. For example, in essential hypertension and in systolic hypertension from any cause the venous pressure is not directly influenced by the greater momentum of the arterial blood. Apparently other factors (mainly the peripheral resistance and variations in the size of the peripheral vascular bed) prevent such influence.

One of the greatest stabilizing effects on venous pressure is produced by variations in the cardiac output. These two factors are interdependent in normal individuals in such a way that an increase in venous pressure or a tendency to such increase evokes an increase in cardiac output. On the other hand, when the venous return diminishes the cardiac output is correspondingly diminished. This stabilizing mechanism can be impaired in two ways: (1) By an increase in the venous return beyond the limits of the reserve power of normal cardiac activity, and (2) by a reduction in the cardiac reserve so that it loses the ability to respond to normal variations in venous return. The first possibility must be very rare, but cases are seen in which death occurs during strenuous exertion due to the sudden dilatation of an apparently normal heart. The second possibility is commonly seen in cases of congestive heart failure.

Gravity. Needless to say, the pressure of the blood in the peripheral veins depends on their hydrostatic level. Clark, Hooker and Weed have shown that the reference point for study of the effect of hydrostatic level on venous pressure is not the right atrium. The point actually varies with each individual according to the elasticity of his veins. This is probably the reason for the wide range of the normal peripheral venous pressure, all measurements being taken under standard conditions and without regard for the fact that the zero hydrostatic level is different in each patient.

Intrathoracic Pressure. The negative intrapleural pressure creates an effective head of pressure in the thoracic veins for filling of the heart. Under normal conditions this factor is noticeable in the peripheral veins as a fluctuation of the venous pressure with the phases of respiration. Hyperventilation or polypnea, which increases the negative intrapleural pressure, greatly lowers the venous pressure. Conversely, apnea (as in the apenic phase of Cheyne-Stokes respiration), coughing, and the Valsalva experiment diminish the negative pressure in the thorax and thereby increase the venous pressure.

Blood Volume. The volume of blood in the body varies little in normal persons. On the other hand, the amounts of blood in various parts of the circulatory system change at different times. Apparently such changes, for example in the peripheral vascular bed, have little influence on venous blood volume, or they are well compensated for in some way, so that they have practically no effect on venous pressure. This is well demonstrated in the facts that venesection and intravenous infusions hardly alter normal venous pressures. However, in peripheral vascular failure the venous pressure may be low due to the fact that most of the blood of the body is in the peripheral vascular bed.

Muscular Exertion. During exertion of the somatic muscles the venous blood pressure is increased due mainly to the compressing effect of the active muscles on the peripheral veins and perhaps partly to the general increase in velocity of blood flow. It is for this reason that measurements of venous pressure are made after the patient has been resting in bed at least 15 minutes. The only cases in which the measurements will be affected under this condition are those in which there is spasm of the muscles (tetanus, meningitis, tetany, etc.) or those in which the patient is uncontrollably restless.

Factors of Less Influence. These need be mentioned only casually. Cardiac systole is said to have a slight aspirating effect on the blood in the large veins, but this effect is seldom noticed in the peripheral veins. In general, thin people have somewhat lower venous blood pressures than obese ones. The venous pressure has been shown by independent work of Hooker and Clark to vary slightly within normal limits at different times of day.

Although there are many variables of physiologic influence on the peripheral venous blood pressure, several of them are controlled by the method of measurement, and the remainder are stabilized in the normal individual by certain compensating effects of his body. Villaret concludes, therefore, and the work of other men supports him, that the physician "is authorized to establish a very simple physical relationship of cause and effect between the lesion that he observes or that he seeks and the change of the blood pressure in the veins."

Clinical Aspects

From the patients studied in the preparation of this paper, 150 have been selected as having been adequately followed for conclusions to be drawn from the data collected on them. At least 2 measurements were made on each patient, and in the case of the patients with congestive heart failure measurements were made at intervals of several days to a week so long as they were under observation. Slightly more than 550 measurements were made in the 150 patients.

The group includes the following types of cases:

1. Seventy-five cases of congestive heart failure. In 21 cases measurement of the venous pressure was the principal means to the establishment of this diagnosis, other signs being slight or masked in some way. In 50 cases the measurements were used only to follow the clinical course of the disease. In 4 cases left ventricular heart failure was present without clinical evidence of right ventricular failure, and the venous pressures were within normal limits.
2. Forty-one cases in which venous pressure measurements were the means to rule out the possibility of congestive heart failure. This group includes such conditions as edema from other causes, cerebral vascular accident, bronchial asthma, lobar pneumonia, peripheral circulatory failure, rheumatic heart disease, severe hypertension, syphilitic heart disease, dyspnea due to causes other than heart failure, and aortic stenosis.
3. Three cases of cardiac compression, 2 acute and 1 chronic.
4. Three cases of mediastinal tumor.
5. Two cases of pleural effusion and 19 cases of pneumothorax or hydropneumothorax.
6. One case of arteriovenous fistula of the popliteal vessels.
7. Six cases in which muscular rigidity was present due either to tetany or epidemic meningitis.

Congestive Heart Failure. In cases of marked congestive heart failure venous pressure measurement has little diagnostic application except as an accessory confirmation. In this type of case the main use of the procedure is in following the clinical course of the patient and observing the response to treatment. Measurements were made at least every 2 or 3 days while the symptoms of heart failure persisted and at intervals of 1 to 2 weeks thereafter in the patients studied. When congestive heart failure is slight, early, or masked by other outstanding symptoms, measurement of the blood pressure in the peripheral veins may be the means to the establishment of this diagnosis. In these cases the procedure is also useful for observing the clinical course of the disease. When left ventricular failure is present without clinical evidence of right ventricular failure, venous pressure measurement has no use except to verify the fact that, so far as can be determined, the right ventricle has not failed.

In congestive heart failure the blood pressure in the peripheral veins varies between 140 and 400 or more millimeters of saline by the method used in these studies. A few patients were observed in whom usual clinical evidences of congestive heart failure were undeniable at the time of their admission to the hospital, but in whom the venous pressure was within normal limits when it was measured for the first time several days after admission. By this time, however, other clinical manifestations of heart failure had disappeared following rest in bed and the administration of digitalis. I believe that this merely indicates that venous pressure measurement in cases of mild congestive heart failure can have diagnostic value only when used before the institution of any form of therapy.

A venous pressure above 200 mm. of saline in congestive heart failure is believed by some men always to be an indication for venesection, and numerous studies have been made to determine the effectiveness of this procedure. I have no personal experience in this regard, but I do not believe that there is enough evidence to support the view that venous pressure measurement alone is an indication for venesection. As a rule, the highest venous pressures occur in cases of relative tricuspid insufficiency. In this condition there is a definite oscillation of the saline in the measuring tube, synchronous with the heart beat and having a valuable diagnostic significance. Congestive heart failure as a complication of lobar pneumonia, chronic glomerulonephritis, cerebral vascular accident, essential hypertension, and other conditions apparently always causes a rise in venous pressure above normal, but none of these conditions alone causes a high venous pressure. From this fact, it is obvious that measurement of the venous pressure is a valuable means to differentiate congestive heart failure from other causes of edema, from peripheral circulatory failure, from bronchial asthma, and from other causes of dyspnea, and to establish or disprove the presence of congestive heart failure in certain serious conditions in which it may or may not be suspected. In this connection the use of the method in cases of pneumonia is especially valuable for the diagnosis of complicating congestive heart failure and as an indication for the administration of digitalis.

Repeated measurements of the venous blood pressure in patients with congestive heart failure yield valuable prognostic information. Berghausen has called attention to the fact that the more slowly the venous pressure returns to normal under proper treatment, the worse the prognosis. My studies bear this out. Twenty-four patients with congestive heart failure were observed in whom the venous pressure remained higher than normal for 8 days or longer or in whom the pressure rose steadily in spite of thorough treatment in the hospital. Eighteen of these patients have died within the period of this study (less than 6 months), and the 6 who may be alive all belong in Class III of the classification of patients by the American Heart Association according to the limitation of their activity. Kastlin and Machlachlan have pointed out that high venous pressures in pneumonia are associated with increased mortality. In my cases only 9 patients with lobar pneumonia were studied. Two were patients with congestive heart failure in whom lobar pneumonia occurred as a complication and proved to be a terminal event. None of the remaining 7 patients had a high venous pressure, and all survived.

Cardiac Compression. The term "cardiac compression" was originated by Beck to describe the condition in which the heart is prevented from filling properly due either to the accumulation of fluid in the pericardial cavity (acute cardiac compression) or to the restricting effect of pericardial adhesions (chronic cardiac compression or Pick's syndrome). The diagnosis of acute cardiac compression is based mainly on a clinical triad, low arterial blood pressure, high venous pressure, and a quiet heart. The similar triad for chronic cardiac compression includes ascites, high venous pressure, and a quiet heart. Both of these conditions endanger life, and both are amenable to surgical treatment, the former by drainage of the pericardial cavity and the latter by pericardiectomy. The diagnosis of both is aided greatly by the measurement of the venous blood pressure, and the efficacy of treatment can be gauged by the degree to which the venous pressure is lowered after operation.

Intrathoracic Lesions. Mediastinal tumors may cause a rise in venous pressure, due mainly to compression of the venae cavae. This fact makes the procedure a valuable diagnostic adjunct to roentgenologic examination. Three cases of mediastinal tumor were observed in this series. One was a neoplasm of undetermined type and two were enlarged lymph nodes in cases of acute lymphatic leukemia. In these latter two cases repeated measurements of the venous pressure were useful to determine the degree of shrinkage of the tumor following roentgen-ray therapy.

The 21 cases of pleural effusion and pneumothorax studied verified the conclusions of previous investigators that neither of these conditions causes high venous pressure unless it is sufficient to provoke dyspnea. Measurement of the venous pressure in patients receiving artificial pneumothorax therapy is often a more delicate guide than measurement of the intrapleural pressure, in that the venous pressure may rise above normal in cases in which the intrapleural pressure has remained negative. This is usually an indication that the patient has received more air than he can tolerate; dyspnea and edema sometimes result.

Arteriovenous Fistula. Only 1 case of arteriovenous fistula has been carefully studied, and this one did not support the observation of Villaret that arteriovenous fistulae usually cause a generalized increase in blood pressure in the peripheral veins. The case studied was one of popliteal arteriovenous communication, and the only peripheral veins in which the blood pressure was elevated above normal were those of the affected leg.

CONCLUSIONS

1. The principal factors influencing the blood pressure in the peripheral veins of normal persons are the heart action, gravity, the intrathoracic pressure, the blood volume, and muscular exercise.
2. The physician "is authorized to establish a very simple physical relationship of cause and effect between the lesion that he observes or that he seeks and the change of the blood pressure in the veins."
3. The results of study of the venous pressure in 150 selected patients are reported.
4. Right ventricular failure always causes a rise in venous pressure above normal, and this rise may be the means to the establishment of the diagnosis of heart failure.
5. Repeated measurements of venous pressure in patients with congestive heart failure are useful to follow the clinical course of the disease and have considerable prognostic importance.
6. High venous pressures in lobar pneumonia have an unfavorable prognostic significance.
7. Measurement of the blood pressure in the peripheral veins is valuable in the diagnosis of cardiac compression and is helpful in estimating the efficacy of surgical treatment in this condition.

8. Venous pressure measurement is useful in the diagnosis of mediastinal tumors and in observing the response of certain types to roentgen-ray therapy.

9. Pleural effusion and pneumothorax do not affect venous pressure unless they are sufficient to provoke dyspnea. Measurement of venous pressure is useful in the regulation of artificial pneumothorax therapy.

10. One case of popliteal arteriovenous aneurism is mentioned in which the venous blood pressure was not generally elevated.

BIBLIOGRAPHY

Beck, C. S., and Cushing, E. H.: Circulatory Stasis of Intrapericardial Origin, Clinical and Surgical Aspects of the Pick Syndrome. J. A. M. A., 1934, **102**, 1,543.

Beck, C. S., and Griswold, R. A.: Pericardiectomy in the Treatment of the Pick Syndrome; Experimental and Clinical Observations. Arch. Surg., 1930, **21**, 1,064.

Berghausen, O.: Venous Blood Pressure and Vital Capacity Determinations as a Measure of Circulatory Fitness. J. Med., 1934, **15**, 22.

Clark, A. H.: Study of the Diagnostic and Prognostic Significance of Venous Pressure Observations in Cardiac Disease. Arch. Int. Med., 1915, **16**, 587.

Clark, J. H., Hooker, D. R., and Weed, L. H.: Hydrostatic Factor in Venous Pressure Measurements. Am. J. Physiol., 1934, **109**, 166.

Eyster, J. A. E.: Clinical Aspects of Venous Pressure. New York, Macmillan, 1929.

Griffith, G. C., Chamberlain, C. T., and Kitchell, J. R.: Simplified Apparatus for Direct Venous Pressure Determination Modified from Moritz and v. Tabora. Am. J. M. Sc., 1934, **187**, 371.

Hooker, D. R.: Observations on the Venous Blood Pressure in Man. Am. J. Physiol., 1914, **35**, 73.

Kastlin, G. J., and Machlachlan, W. W. G.: Venous Pressure in Pneumonia. Ann. Int. Med., 1931, **4**, 959.

Villaret, M., and Desoille, H.: Clinical Examples Showing General Interest of Phlebopiezometry from Diagnostic, Prognostic and Therapeutic Points of View. Presse méd., 1932, **40**, 1,477.

Villaret, M., Saint-Girons, Fr., and Justin-Besancon, L.: La pression veineuse peripherique. Paris, Masson, 1930.

Studies in Diabetes Mellitus. IV. Etiology. . . . *The Etiology of Diabetes. Viewpoint and Method of Analysis.*—The factors which have been suggested as entering into the etiology of diabetes are many: heredity, obesity, arteriosclerosis, gallbladder disease, nervous strain, pituitary disease, thyroid disease and other conditions. It has been suggested even that there are several types of diabetes; that the diabetes of childhood, of middle life and old age are distinct entities. It is the belief of the authors, however, that there is an essential unity in diabetes and that this unifying factor is heredity. The other factors are essentially of the nature of excitants of the disease. Heredity determines the susceptible individuals, but since the disease is rarely, if ever, present at birth, it is reasonable to postulate at least one or more other factors which act to bring out the inherited predisposition. On this basis, the essential difference between the diabetes of the several ages of life may reflect only the typical age incidence of the various excitants.

Some of the factors, moreover, seem more and more to be linked. The nature of this relationship reflects the newer concept of diabetes as involving not only the islands of Langerhans, but other organs, if not the whole endocrine system of the body. Without destroying the validity of this view of heredity as the unifying factor, however, it is possible that isolated cases may have no hereditary background, such, for example, as might be the diabetes resulting from hemochromatosis, although the heredity is unusually strong in this group. Perhaps it is only the hereditarily predisposed hemochromatosis patient who develops diabetes.

This theory of the unity of diabetes is in our opinion correct, but in the present state of our knowledge, not fully demonstrable. Certainly all of the elements which contribute to the proof cannot come out of a purely clinical experience. Much of it depends upon work in several scientific fields, especially in experimental biology, pathology and biochemistry. While much has been or is being done, the fundamental researches are far from complete. Within the limitations described, the present paper seeks to show what light can be thrown on the problem by this clinical experience, supplemented by the results of investigations in the other related fields. Our approach to the problem is through an analysis of the constitutional factors and medical history of the diabetic patient at the onset of the disease. . . .

Summary: 1. A representative group, of 6,357 private diabetic patients (treated by Joslin in the office or hospital or by consultation over a period of 30 years) and of 463 diabetic children seen more recently, is described together with an analysis of various etiological features of the disease, which lend themselves to statistical interpretation.

2. The residence of 85 per cent of the patients was in New England, 67 per cent in Massachusetts, 41 per cent in the Boston Metropolitan District and 14 per cent in Boston itself.

3. American nativity characterized approximately two thirds of the adult patients; one sixth of the patients were Jews, although but one twelfth of the population in the area from which they came was of that race.

4. Occupations were diverse, but there was a rather large proportion of proprietors, officials, managers and members of professions. Physicians alone amounted to 6.9 per cent of 2,304 patients whose occupations were definitely recorded.

5. Most of the patients were first examined because of symptoms of diabetes, but a large number were diagnosed as a result of routine examinations. Insurance was the chief of these and accounted for the recognition of 12.6 per cent of the males. The number of cases diagnosed after application for insurance has steadily increased.

6. Males exceeded females until 1922, but since that date the situation has been reversed and the disparity is definitely increasing.

7. The number of cases increased steadily from infancy to a maximum at ages 50 to 54, except for a slight dip in the late teens, and dropped rather sharply from the peak in old age. There has been a definite increase in recent years in the proportion of patients at the older ages; past 60 among males and past 50 among females. Comparative data are given for other diabetic series. Analysis with regard to the true incidence of age at onset of diabetes shows that onset is most frequent in the sixth decade, and next highest in the seventh decade.

8. Jewish patients develop diabetes relatively young. The median age at onset of the Jewish patients was more than 2 years younger than that of all patients. Jewish female patients exceeded the males up to the end of 1928 by 46.3 per cent and in the late forties and fifties, by nearly 2 to 1.

9. The present series of cases partially confirms the New York City data of Mosenthal and Bolduan, which show that the incidence of diabetes in married women is higher than in single women. No difference, however, was found between single and married men. The frequency of onset among women in the late forties or fifties reflects the strain on the endocrine system during menopause when gain in weight is also usual.

10. The height of diabetic children at onset tends definitely to be above average, but there is a normal distribution of height of diabetic adults.

11. The weights of adults in this group at onset of the disease were definitely above standard. Among males aged 20 or over at onset, 78.5 per cent were at least 5 per cent overweight at the time of their maximum weight, and among women, no less than 83.3 per cent. In children and adolescents, on the other hand, twice as many were underweight as overweight.

12. In Jewish adult patients, the tendency toward obesity was even more marked than among other patients. Of the Jewish men, 86.8 per cent were overweight and 94.3 per cent of the Jewish women.

13. Hyperthyroidism was present in 1 per cent of the males and 3 per cent of the females first seen during 1921 to 1928.

14. The influence of the pituitary and adrenal glands upon diabetes is discussed.

15. A history of biliary tract disease was reported by 3.6 per cent of the men and 9.9 per cent of the women first seen in 1925 to 1928. Practically all of the diabetics with gallbladder disease were overweight.

16. Arteriosclerosis was practically absent in diabetics under age 20 whose diabetes was of less than 1 year's duration. It increased with advancing age until at ages 60 and over every male diabetic exhibited it in some degree.

17. Cancer of the pancreas is a cause of diabetes in a small percentage of cases.

Extract from article by Elliott P. Joslin, M.D., Boston, Louis I. Dublin, Ph.D., and Herbert H. Marks, New York City, *American Journal of the Medical Sciences, June, 1936, p. 759, and July, 1936, p. 9.*

THE CLINICAL SIGNIFICANCE OF THE BLOOD CIRCULATION TIME AS DETERMINED BY THE SACCHARIN TEST*

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During the past 10 years the clinical significance of the rate of blood circulation has been of interest to many investigators. A large amount of research work has been directed toward the development of a practical clinical procedure for the determination of the circulation time. A review of the literature reveals little evidence of such a procedure. Blumgart using an accurate but somewhat impractical method for the determination of the circulation time, probably has done more work concerning its clinical significance than anyone.

In 1933 Fishberg, Hitzig and King published an article describing for the first time the saccharin method for determining the circulation time. They used this test on 63 normal persons. The procedure is as follows: Two cc. of a solution containing $2\frac{1}{2}$ grams of saccharin in each 2 cc. of water, after having been sterilized, is injected, as rapidly as possible, into a vein in the antecubital fossa of either arm by means of a syringe and a 20-gauge needle. With a stop watch the time is recorded from the end of injection until the saccharin is tasted. Care must be taken that the patient breathes normally during the test, because the holding of the breath causes an increased intrapulmonary pressure which in turn might alter the circulation rate.

I have performed 42 such tests on 16 persons free from any disease which might alter the circulation rate. A slight deviation in the procedure has been that the time was recorded from the onset, instead of from the end of injection, until the saccharin was tasted. The times were between 12 and 18 seconds, this being 1 to 2 seconds longer than the normal range recorded by Fishberg, Hitzig and King. The difference may be accounted for in the period of injection. In normal subjects the end point of this test was found to be sharp and consistent. No complications were noted.

When the heart rate is increased in the absence of underlying cardiac disease or mechanical factors which might affect the rate of blood flow, the circulation time is inversely proportionate to the increase in heart rate. Seven tests were performed on patients conforming to the above specifications while they were in the Kettering Hypertherm, their temperatures ranging between 104°F. and 107°F. and their pulse rates ranging between 110 and 160. Three tests were done after exercise, the pulse rates being between 112 and 126. One test was performed during an attack of paroxysmal tachycardia in a young man with no evidence of organic cardiac disease. The recorded periods were 2 to 5 seconds below the lower limit of normal. These persons had circulation times 3 to 4 seconds above the lower limit of normal when their pulse rates were in the vicinity of 80. Reports in the literature indicate that the circulation rate may be more rapid in hyperthyroidism, the anemias and in children. The factor of increased pulse rate is perhaps the main cause. On the other hand, in myxedema the circulation rate may be decreased.

Most of my investigation was done in relation to congestive heart failure. The circulation time was taken on a few persons in whom mechanical factors were present which in the absence of congestive heart failure might alter the circulation rate. Two hundred ninety-four tests were done on 51 persons in these groups. In almost all cases of congestive heart failure the circulation time was increased. The exceptions were those subjects presenting clinical signs and symptoms of congestive heart failure for the first time and then only in the early stages. In these the circulation time was around the upper limit of normal. The accelerated heart rate, always present, was probably one of the main factors by which the circulation time was maintained within normal limits. Ultimately, the circulation time becomes increased in this group. Then, as in other patients with congestive heart failure, the circulation time may be anywhere from 3 to 40 seconds above normal, the extent of prolongation bearing a close relation to the degree of heart failure (Table 1). The extent of the heart failure, however, cannot always be gauged by the character of the clinical manifestations. This statement is made because some patients, especially elderly ones, appearing less ill than others, had more prolonged circulation times. I believe the degree of heart failure, as a rule, evidences itself more in the extent of alteration of the circulation time than in clinical symptoms and signs.

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* Read before the Annual Scientific Assembly of the Society, May 7, 1936.

TABLE 1

The Alterations in the Circulation Time as Noted in a Group of Cases with Congestive Heart Failure

Severity of Clinical Symptoms		Number of Failures	Circulation Time		Mechanical Factors
At Onset	After Adequate Therapy		At Onset	During Course. Number of days after initial circulation time appear in parenthesis above each succeeding test	
			seconds		
++++	++	3	30	(2) (4) (7) (9) (12) (19) (26) (33) (41) 30 31 29 30 30 32 30 34 33*	Mitral stenosis and regurgitation
+++	+−	1	34	(1) (4) (5) (7) (10) (12) 30 28 24 22 23 21	Mitral regurgitation
++	+−	1	27	(2) (3) (6) (8) 23 24 22 20	Hypertensive heart disease
++++	+++	2	48	(2) (3) (6) (8) (9) 40 42 37 40 47*	Aortic regurgitation
+++	+−	2	49	(1) (4) (7) (10) (14) (19) 48 45 34 31 28 29†	Mitral regurgitation
++++	+−	0	37	(2) (3) (7) (10) (14) (21) 35 30 24 26 24 21	Mitral regurgitation
++	+	1	38	(3) (6) (11) (16) (21) 34 42 35 39 46*	Mitral regurgitation
+++	−	0	22	(1) (3) (6) (10) 21 20 19 20	Hypertensive heart disease
+++	++	1	32	(2) (4) (7) (10) 30 28 30 35*	Marked hypertension
+++	+	0	48	(1) (4) (8) (11) (14) (17) 48 49 44 45 40 41	Aortic and mitral regurgitation
+++	++	2	24	(2) (5) (6) (12) (20) 33 28 24 30 36*	Auricular fibrillation
++++	++++	0	26	(1) (3) 31 36*	Mitral regurgitation
++	+	1	33	(2) (4) (7) (9) (13) 34 30 33 31 28	Auricular fibrillation
+++	+−	1	48	(2) (6) (7) (9) (13) (15) (18) 45 41 43 50 43 39 40	Heart block
++	+−	1	37	(2) (5) (8) (10) (13) 38 35 33 33 31	Aortic regurgitation

* Died.

† Left hospital on own responsibility.

Left heart failure associated with little if any right heart failure, as manifested by the absence of signs of systemic venous congestion, was associated with moderately prolonged circulation time, the usual alteration having been 3 to 10 seconds above normal. The rate of blood flow was usually slowest when both the right and left sides of the heart were affected, and again the increase in the circulation time was apparently comparable to the degree of failure of the heart as a whole. The usual circulation time was between 15 and 40 seconds above normal.

There are reports in the literature that the circulation time is of importance in differentiating bronchial asthma from congestive heart failure. I can neither affirm nor deny this at the present time, having done only 3 tests on 1 case of bronchial asthma. The recordings were 19, 18 and 15 seconds, the first test having been performed about 6 hours after the patient entered the hospital with an attack of asthma.

From the few facts outlined I feel that the circulation time is of little value in the diagnosis of congestive heart failure. Once it is altered, however, it does seem to give a fairly accurate idea of the severity of the heart failure.

The circulation time is of a greater significance in prognosis. Once altered, it returns to normal in an almost negligible number of cases. If, upon the institution of therapy the circulation rate tends to drop from its peak of change toward normal fairly rapidly, that is, over a period of a week or less, the outlook is best. The closer the circulation time approximates normal in its descent, the more favorable the prognosis. A fairly good idea of the cardiac reserve may be gained from these two points. If a circulation time of 8 or more seconds above the normal varies little within a week the prognosis as a rule is poor. The same may be said of recordings which are greatly prolonged, that is, in the vicinity of 35 or 40 points above normal. When the time increases in spite of adequate therapy, the immediate prognosis is extremely grave.

Certain mechanical factors, such as mitral regurgitation, mitral stenosis, aortic regurgitation, aortic stenosis, auricular fibrillation and arteriovenous aneurism, in most instances, are associated with an elevated circulation time, the range usually being from 3 to 15 seconds above normal. The same may be said to be true of heart block except that the time may be more prolonged. It is interesting to note in reference to arteriovenous aneurism that upon occlusion of the aneurism by pressure the circulation time may decrease 5 or 6 seconds. In the presence of valvular heart lesions the circulation time may give a fair idea of the degree of cardiac insufficiency, in the absence of definite congestive heart failure. When these mechanical factors exist in cases of congestive heart failure it should be remembered that the extent of prolongation of the circulation time may be closely related to the summation of effects of both entities.

In using the saccharin method for the determination of the circulation time in cardiac patients several unfavorable points were manifested. Three per cent of the tests were of no value because the saccharin was not tasted. Occasionally in these instances much larger amounts of saccharin were not tasted after injection. The saccharin was readily tasted, however, when less than 1 minim was placed on the tongue, proving the sense of taste was not impaired. Reaction in the vicinity of injection was noted in 6 patients. This consisted of swelling of the upper part of the forearm which sometimes extended into the lower part of the forearm and hand, a glistening skin, a palpable, tender, firm vein underlying the site of injection (in 4 cases) and extreme pain on flexion of the forearm. Three to 5 weeks elapsed prior to the disappearance of these reactions. About 20 per cent of the patients, mostly women, objected to the repetition of the test because of the sickening sweet taste of saccharin. Nausea and vomiting occasionally occurred, mainly because of the taste of this substance. No general ill effects were noted.

In concluding, I wish to state that the alterations in the circulation time may be of great clinical significance, especially in congestive heart failure. They may be a gauge to the severity of the heart failure and thus may help in the prognosis. They may be a guide to the handling of a case, after the acute manifestations of congestive heart failure have subsided. A patient with a fairly prolonged circulation time after apparent compensation is established should be allowed little activity. The saccharin test for the determination of the blood circulation time, in the absence of the unfavorable points, seems to be a good practical test.

BIBLIOGRAPHY

Blumgart, H. L.: Velocity of Blood Flow in Health and Disease; Velocity of Blood Flow in Man and its Relation to Other Measurements of Circulation. Medicine, 1931, **10**, 1.

Fishberg, A. M., Hitzig, W. M., and King, F. H.: Measurement of Circulation Time with Saccharin. Proc. Soc. Exper. Biol. & Med., 1933, **30**, 651.

HEPATOSPLENOGRAPHY WITH STABILIZED THORIUM DIOXIDE SOL.

A FOLLOW-UP STUDY OF TWO HUNDRED PATIENTS EXAMINED OVER A PERIOD OF FIVE YEARS*†

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Since 1928 when Oka in Tokio and soon thereafter Radt in Berlin began work to develop a method for demonstrating the morbid anatomy of the liver and spleen on X-ray plates by means of thorium preparations injected into the blood stream, several groups of investigators have had a moderately large experience with this procedure. However, those who have used this method of diagnosis have been relatively few due to the facts that thorium dioxide, the substance adopted, possesses some radioactivity and is extremely slowly eliminated from the body. In 1932 the Council on Pharmacy and Chemistry of the American Medical Association reported unfavorably on the intravenous use of thorium dioxide and urged great caution in its use in man. One of the points stressed in this report was that there is a possibility that the thorium dioxide in the tissues might be converted as time went on, in part at least, to some more radioactive substance, such as mesothorium, and that radium poisoning possibly would result.

The purpose of this report is to review the experience of our use with this method of diagnosis which has covered a period of nearly 5 years and which has involved considerably more than 200 patients. The preparation we have used in all our cases has been a stabilized colloidal solution of thorium dioxide containing approximately 22 per cent of metal by volume.* This substance, when injected into the blood stream, is rapidly removed and engulfed by the reticulo-endothelial cells throughout the body. These cells, being most numerous in the liver and spleen, allow these organs to be demonstrated on X-ray films, because thorium, a metal of high atomic weight, is radiopaque.

Even after a period of 5 years X-ray films demonstrate that there is still a large amount of the metal present in the body, but there is also definite evidence of some mobilization of it from the reticulo-endothelial cells in which it was originally deposited.

Immediate reactions due to the injection of the solution in the amount used have been extremely few and on the whole extremely mild. In the last 3 years we have not noted any immediate reactions that were apparent to ordinary observation. Some patients have received as much as 100 cc., and 1 was given this entire amount within 1 hour without an appreciable reaction.

Solution of thorium dioxide is also of value in other fields of roentgenology. It is the best medium for arteriography, and it is satisfactory for ventriculography and retrograde pyelography. Our previous reports and those of others who have had considerable experience with hepatosplenography have demonstrated its usefulness in the diagnosis of intra-abdominal disease. In the report of our clinical experience with our first 80 patients we concluded with the statement that "greater experience with it will reveal its true value, its finer points, and its limitations." We feel that we have progressed considerably in the direction of knowing these facts.

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† Abstract of paper to be published in full elsewhere.

‡ Dr. Otell died July 27, 1936.

* The preparation employed was Thorotrast, manufactured by the Heyden Chemical Corporation of New York City.

TECHNIC OF HEPATOSPLENOGRAPHY

Until recently we have employed an average of 75 cc. of the stabilized solution of thorium dioxide in adults of average size and have reduced the total dosage in children roughly in proportion to the weight. We are now using ½ cc. for each pound of body weight. One third of the total dosage is usually injected intravenously on each of 3 successive days, and on the fourth day or at any time thereafter the films are made. No particular preparation of the patient is necessary except that it is advisable to have the intestinal tract as free of gas as possible when the X-ray exposures are made. Films are taken with very much the same technic described in our previous paper.

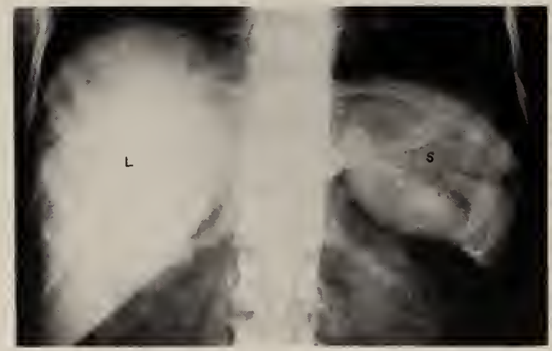

FIG. 1. Normal hepatosplenogram; L, liver; S, spleen.

APPEARANCE AND SIZE OF THE NORMAL LIVER AND SPLEEN

In good films made within a year or two after the injection of the solution, the liver casts a relatively homogeneous shadow of approximately the same density as the spine (Fig. 1). The spleen normally has a density slightly less than that of the liver and about the same as that of the ribs. Its shadow is usually homogeneous. So far as determination of the size of the liver and spleen is concerned, this can be done only roughly, especially in comparative progress films. We have noted that it is only within certain limits that deviations in size from the normal and from time to time are reliable. Even the shape of the liver and spleen may vary in films taken at different times. Considerable experience is, therefore, necessary before too much importance can be attached to moderate variations in shape and size.

USES OF HEPATOSPLENOGRAPHY

While much information can often be obtained by the study of films alone, it is only proper that all of the clinical findings should be taken into consideration at the same time. This rule, of course, applies to roentgenology in general.

In a previous article we concluded that the method is of value as follows:

1. In determining the nature of a mass in the upper part of the abdomen.
2. To determine the presence and kind of hepatic disease (atrophic cirrhosis, hypertrophic cirrhosis, syphilis of the liver, metastatic malignant lesions, primary tumor, abscess, cyst and amyloidosis).
3. To ascertain whether metastatic lesions are present in the liver if operation is contemplated for carcinoma.
4. To demonstrate rupture of the liver or spleen.
5. To determine the cause of jaundice (whether intrahepatic or due to obstruction of the common bile duct).
6. To follow the progress of hepatic or splenic disease.
7. To demonstrate whether a lesion is above or below the diaphragm.
8. To diagnose ascites.
9. To study diseases of the spleen.

CONTRAINDICATIONS TO HEPATOSPLENOGRAPHY

Our experience has shown that there are no contraindications yet established for the procedure. We have used the solution in cases of almost every kind without observing any definite deleterious effect. A number of our patients had severe jaundice of various durations and causes. Even in cases of acute hepatitis damage to the liver apparently has not resulted. We doubt also the suggested contraindication of pulmonary tuberculosis, since the animal experimentation upon which this assumption was based has been found to be faulty.

In general, although we consider hepatosplenography harmless, it should not be used unless more simple methods of diagnosis fail. Some of the cases originally selected would not today be used, but in the beginning information was essential.

Study of the First 200 Cases

A careful follow-up study has been made of the first 200 patients for whom thorium dioxide was employed. Of these, 47 are known to be living and 36 have actually been re-examined both roentgenographically and generally. Bromsulphalein tests of liver function and other studies as indicated have also been performed in a considerable number. Of the living patients, confirmation of the clinical and roentgenological diagnoses was obtained either by biopsy of the liver or by celiotomy in 10 instances. Reports of those not actually examined have been received from the patients by social service workers or from the physicians involved. One hundred thirty-four patients are known to be dead, and the actual or approximate time of death is known in all. Definite diagnoses were obtainable in 73 (56 by necropsy, 15 by biopsy, and 23 by celiotomy). Nineteen patients could not be located, but a number of these are assumed to be living on the basis of their known preëxisting conditions (Table 1).

Although the diagnoses in the vast majority of both living and dead patients in whom confirmation was not obtained were undoubtedly correct on the basis of clinical studies and roentgenograms, we shall discuss from the standpoint of accuracy of diagnosis by hepatosplenography only those cases in which confirmation was obtained.

The interpretation of the hepatosplenograms was proved to be correct in 67 of the 73 cases. Among the 6 cases wrongly diagnosed on this basis there were 4 in which metastases were not apparent in the films but in which some very small ones were found to be present at necropsy. In another case cirrhosis of the liver was found to exist which had not been previously diagnosed. In still another primary carcinoma of the liver was found but metastatic carcinoma had been diagnosed (Table 2).

TABLE 1

General Survey of 200 Cases with Hepatosplenography

STATUS OF PATIENTS		NECROPSY	BIOPSY	CELIOTOMY
Living	47	0	3	9
Dead	134	56	12	9
Untraced	19	0	0	5
Total	200	56	15	23

TABLE 2

Diagnostic Accuracy of Hepatosplenography in 73 Proved Cases

Correct	67		
Incorrect	6	Metastatic lesions in liver unsuspected	4
		Cirrhosis of liver not diagnosed	1
		Primary carcinoma diagnosed metastatic carcinoma	1
			6

The value of hepatosplenography in the whole group of 200 patients is indicated by the following figures:

1. The clinical diagnosis was confirmed in 61 cases.
2. The diagnosis was made from the hepatosplenograms in 49 cases.
3. The procedure was used to eliminate or to establish the presence of metastases in the liver in 46 cases.
4. The method was of no help in making the diagnosis, or was of negative value in 35 cases.
5. The diagnoses made on the basis of the films were wrong in 6 cases.

Therefore, hepatosplenography was of definite value in the study of 156 of the 200 cases.

The majority of the 200 patients were suffering from some fatal malady. The diagnosis of cirrhosis of the liver of one type or another was made either clinically or by more definite methods in 52 instances. Carcinoma of some organ was present in 58 cases, with metastases occurring in the liver in 38. Leukemia of some type existed in 10 cases. Instances of other serious diseases occurred in smaller numbers.

Review of the Living Patients

In the group of 47 patients who have received thorium dioxide and are still living the youngest patient was 3 years old and the oldest 74 years old at the time of administration of the solution. There were 25 females and 22 males. Twenty-six different diagnoses were made in this group. The largest single diagnostic group was cirrhosis of the liver of the Laënnec type (10 cases). The lengths of time elapsing between the administration of thorium dioxide and March 15, 1936, varied between a few months and 4 years and 9 months, the time which had elapsed since the injection of 60 cc. of thorium dioxide sol into the first patient who is still living and well, in spite of chronic lymphatic leukemia.

TABLE 3

Roentgenographic Appearances on Re-examination of 47 Cases

No change or slight diminution in density of liver and spleen	20
Evidence of cirrhosis not present on first examination	2
Cases showing mottling of liver or (and) spleen	22
Cases showing visible lymph nodes near liver or (and) spleen	14
Cases showing both mottling of liver or (and) spleen and visible lymph nodes	10

Of the 47 patients known to be living, 36 have been re-examined either at intervals or within very recent date of the writing of this report, both from the general clinical standpoint and by X-ray films of the abdomen. The bromsulphalein test of liver function was performed in 25 of these patients. Of these 25 patients, 12 had acute or chronic disease of the liver. This group of 12 patients is particularly significant in illustrating the harmlessness of stabilized thorium dioxide sol, both as to the effect of the prolonged presence of myriads of foreign bodies in the reticulo-endothelial system generally and in the liver particularly, and as to the question of radioactivity of the metal in the dosage employed. These patients had been injected with thorium dioxide between 1 and 5 years previously. All but 4 of them are in excellent health subjectively, 3 are fairly well, and only 1 has progressed to a serious state of hepatic insufficiency clinically. Of the 25 patients on whom the bromsulphalein test was performed, only 5 showed retention of the dye at the end of 30 minutes. Four were cases of serious chronic liver disease, and 1 was a case of severe congestive heart failure with chronic passive congestion of the liver.

In the whole group of patients re-examined particular attention was given to the question of intercurrent infections, and it was surprising to note the relative infrequency of such diseases as grippe and common respiratory infections in the group.

Review of the Patients Who Have Died

All of the 134 patients who are dead were suffering from advanced, serious, usually chronic, but in 3 instances acute, disease. In 6 cases the diagnosis was undetermined. Most of the patients died within a year, but some lived longer, and 1 lived 3 years and 6 months (cirrhosis of the liver). Eleven of the patients now dead were rechecked roentgenographically.

Roentgenographic Appearances on Re-examination

In 47 of the 200 cases, roentgenologic re-examinations were made, in most instances only once, but in several instances several times at intervals of months or years. In 20 cases there was relatively little change in the appearance of the roentgenogram. In 2 cases changes were noted in the liver which were additional aids in the diagnosis. In both, the liver had appeared normal on the first examination, whereas in the progress films definite evidence of cirrhosis was apparent. Both had been merely suspected of having cirrhosis at the time of the first examination (Table 3).

In 26 cases definite evidence was shown on the films of mobilization or elimination of the thorium dioxide. This took the form either of mottling of the liver or spleen or both, or of the existence of visible lymph nodes either between the liver and the spine or between the spleen and the spine (Fig. 2). There was very little difference in the periods of time elapsing, however, between the cases with such changes and those without. The mottling gave definitely the appearance of some opaque substance in the lymphatics of the organ and also gave the impression of considerable reduction of the amount of metal in the organ (Fig. 3). The lymph nodes were usually quite distinct when they were seen and were undoubtedly due to the presence of relatively large amounts of thorium dioxide in the nodes draining the liver or spleen or both. There is obviously considerable individual variation in the rapidity with which the thorium dioxide is mobilized, and its elimination from the reticulo-endothelial cells of the liver and spleen is on the whole a slow process.

PRELIMINARY REPORT OF HISTOPATHOLOGIC STUDIES OF 71 CASES*

The thorium dioxide in sections stained with hematoxylin and eosin appears as brownish-gray granules, especially in the liver and spleen. In the liver there are oval or round masses of these granules in the sinusoids; there is none in the liver cells and rarely very much in the connective tissue of the portal areas. The masses have the size and outline of the reticulo-endothelial cells, but usually the granules are so abundant that the nuclei of these cells cannot be seen; however, in some cases they are less numerous, and the nuclei are distinctly visible.

In many of the cases the masses of granules are distributed quite uniformly through the liver lobule; in some, however, the masses tend to form groups anywhere in the lobule but at times in the central zone. In cases of chronic passive congestion with atrophy of liver cells and widening of the sinusoids in the central zone, this grouping in the central zone may be more apparent than real.

In none of the cases is there the slightest evidence of any injury to the liver cells, irrespective of the length of time the metal has been present. Even in the cases in which the masses of granules are grouped in the sinusoids, the liver cells lying next to and around these groups are normal in size, appearance and staining properties and do not contain fat or blood pigment. There is no cellular reaction or fibrosis in the liver in the region of these masses, indicating any effort to wall off the masses.

The same appearance exists in the splenic pulp, except that there the granules are frequently seen as blotches and patches, in addition to the oval or round compact masses. There

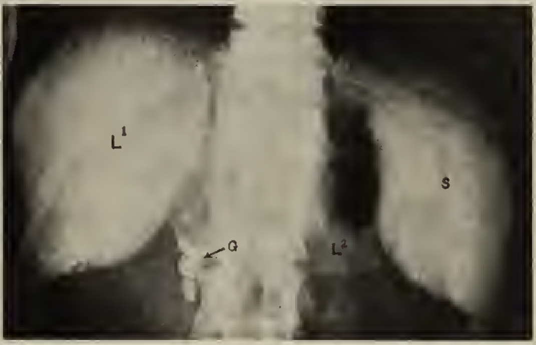

FIG. 2. Hepatosplenogram made 4 years after injection of Thorotrast in a case of portal cirrhosis of the liver. L¹, small right lobe of liver with linear mottling; L², large left lobe of liver; S, slightly enlarged spleen with granular mottling; G, lymph glands containing Thorotrast mobilized from liver.

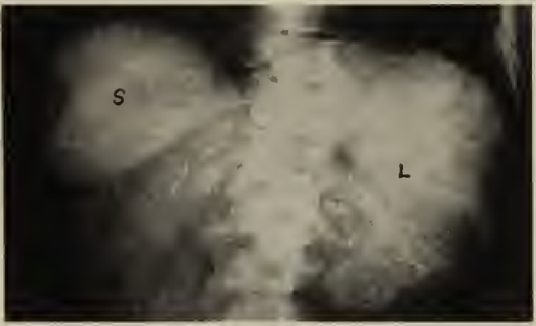

FIG. 3. Hepatosplenogram made 2 years after injection of Thorotrast in a case of syphilitic cirrhosis of the liver. L, large lobulated liver with linear mottling showing Thorotrast mobilized to hepatic lymphatics; S, slightly enlarged spleen.

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* By Dr. Eugene R. Whitmore. Complete report will appear later.

is not nearly as great accumulation of the granules in the splenic corpuscles as in the pulp, and there is very little in the connective tissue of the trabeculae and capsule. At times, however, the masses of granules outline the fibrous trabeculae and occasionally the blood vessels. There is no evidence of any cellular reaction or fibrosis in the spleen in the region of these masses.

Relatively small amounts of thorium dioxide are present in the other organs and the lymph nodes. Again, there is no evidence of any reaction that can be attributed to the presence of the metal.

Summary and Conclusions

A review has been made of 200 cases in which hepatosplenography with stabilized thorium dioxide sol was employed as a diagnostic aid during the past 5 years. The procedure was of value in 156 cases. The diagnosis was made almost entirely on the basis of the hepatosplenograms in 49 cases.

The use of thorium dioxide in the form and amounts used is apparently harmless. Although most of the patients studied had incurable and rapidly fatal diseases, 47 of the patients are known to be alive and in remarkably good condition months and years after the injection. Some of them have lived more than 4 years. A number of them have cirrhosis of the liver, but clinical studies including the bromsulphalein test of liver function have shown remarkably little progression in the severity of the disease in most cases. The patients have shown no increased susceptibility to infection.

The thorium dioxide is eliminated very slowly. The shadows in the roentgenograms due to its presence in the liver and spleen show very little reduction in density after 3 and 4 years. However, after a variable length of time, usually more than 2 years, there may be evidence of mobilization from the fixed reticulo-endothelial cells of the liver and spleen to the lymphatics of these organs and to adjacent lymph nodes.

A preliminary histopathologic study of 71 cases indicates that the presence of the thorium dioxide has not caused appreciable organic changes.

It is predicted that hepatosplenography with stabilized thorium dioxide sol will come to be recognized as a valuable and essentially harmless diagnostic procedure.

Pituitary Growth Factor. Some Clinical Considerations.—The growth factor was the first secretory influence to be suspected and verified in the pituitary gland. In 1885, Pierre Marie described, "a peculiar, noncongenital hypertrophy of the upper, lower and cephalic extremities," which he termed acromegaly. Two years later Minkowski suggested the rôle of the pituitary in this process. Marie, who was soon won to this point of view, felt that the disorder must be due to underfunction of the organ, if it was not a problem of intoxication rather than of aberrant secretion. His conception was natural since, at autopsy, most of the cases recorded proved to have destructive tumors in this area. While Sir Arthur Keith was first to recognize an enlargement of the sella turcica in relation to gigantism, he held much the same view as Marie regarding the processes involved. Massolongo (1892) not only argued that acromegaly and gigantism were one and the same disorder at different periods of life, but, through careful histological studies, suggested that both were the result of excessive, rather than of diminished, secretion. By the turn of the century, Hutchinson's findings of definite pituitary hyperplasia in 44 out of 48 autopsied acromegalies left little doubt on this point. . . .

Comment: . . . We are forced to believe that there is a genuine need for a potent hypophyseal growth promoting hormone in clinical medicine. First, because of the myriad sufferers from understature who crave a semblance of normalcy. No one, not actively engaged in this type of endeavor, can appreciate the somatopsychic inferiorities with which many of these persons are afflicted. Fortunately, this is not always true of the actual dwarf who, for economic reasons, frequently finds it more profitable to be very small than merely a few inches under the low average normal. Secondly, while classic Simmond's Disease is rare, a form of borderline or modified pituitary cachexia is, perhaps, more common than many suspect, particularly the transitional or so-called burned out pitutitary case. When considering that acidophilic elements in the adenohypophysis must have an important place in the maintenance of the body economy long after the process of growth is completed, and that in spite of their protected position they are vulnerable to new growth, hemorrhage, infarcts, cysts, calcification, abscess formation, syphilis and other inflammatory processes, bony encroachment, defective development, metabolic disorders originating elsewhere and even functional disturbances of the vascular and nervous mechanism, this should not be surprising. Aside from these, there is need for a potent product in clinical research as in the therapeutic investigation of obscure bone, joint and muscular dystrophies, which may prove of pituitary origin. . . .

Summary and Conclusions: After some years' experience with 2 preparations of the bovine adenohypophysis relatively high in growth promoting principles, an attempt is made to evaluate their clinical usefulness. In a critical analysis three questions were propounded: (1) Would a potent hypophyseal growth promoting hormone be of value in clinical medicine? (2) If so, are the preparations under discussion sufficiently active to be practical? (3) Are these preparations otherwise physiologically inocuous, or might their indiscriminate use be attended by danger?

While much of the clinical material continues under observation, it is felt enough has been learned to warrant a few conclusions, namely, a pure, potent, hypophyseal growth hormone would be a boon to medicine. The preparations under discussion are sufficiently active to stimulate growth (during the growth period), but not at a rate, sufficiently above normal, to rehabilitate the classic dwarf. They appear to have little effect, after the growth period, even when the epiphyses remain open. It is theoretically possible, but clinically impractical to prevent dwarfism, when the growth increment is 50 per cent or more deficient. It would appear that they are sufficiently active to keep the growth up to, or slightly in excess of the normal, in persons who are from 25 to 50 per cent deficient in the growth increment. They are also sufficiently active to produce a rapid gain in weight and increased muscular strength and to maintain, at a low level of normalcy, persons suffering from modified forms of pituitary cachexia resembling transitional acromegaly or Simmond's Disease. In final analysis, while the growth stimulating property of these preparations does not warrant enthusiasm, the preparations are clinically useful. Although few untoward effects have been discovered, in persons treated by these preparations, and the dangers incident to their use would appear exaggerated, their contamination with other active hypophyseal fractions, together with the possibility of producing antagonistic influences, would make their indiscriminate use, at this time, undesirable.

Extract from article by E. Kost Shelton, M.D., Santa Barbara, *California and Western Medicine, July, 1936, p. 20.*

ACROMEGALY*

A CASE STUDY FROM THE GEORGE WASHINGTON UNIVERSITY ENDOCRINE CLINIC

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Acromegaly was one of the first endocrinopathies to be recognized as a clinical entity and associated with the disturbance of the function of an endocrine gland. The disease is not rare and is met with sufficiently often to offer no difficulties in diagnosis. Briefly, it may be described as a condition resulting from an abnormal outpouring of growth hormone by the eosinophilic cells of the anterior lobe of the pituitary gland, and because of its occurrence in adult life affects only those structures which still remain sensitive to this growth stimulus—the flat bones and soft tissues.

The clinical picture has been repeatedly described in the literature and we venture to add another case, because we have had the opportunity to study it rather completely from an endocrine standpoint.

Report of Case

The case is that of a white woman, aged 39 years, who was admitted to the Endocrine Clinic of the George Washington University Hospital on January 19, 1934. Her complaints were: (1) Headache; (2) increase in size of the face, hands and feet; (3) loss of weight; and (4) nervousness. The onset of the symptoms had been gradual, developing over the preceding 2 years. Headache, the first symptom to be noticed, was occipital and bitemporal in location, and intense and aching in character, occurring in attacks at irregular intervals of 2 to 10 days, and lasting 1 to several days. They were not apparently related to diet, menstruation or other bodily function. They were often accompanied by dizziness, blurring of vision and diplopia. Somewhat later she observed that her hands, face and feet were becoming larger with a change in the contour of her face. In the previous 3 months a painless swelling of the face and hands, more marked on arising in the morning, had appeared. Palpitation and dyspnea, accompanied by a mild precordial ache, were present on mild exertion. Constipation had been present for many years, and recently she had been bothered with hemorrhoids. No urinary symptoms were present.

Menstruation began at 13 years, occurred regularly at 28-day intervals, and lasted 3 to 5 days. Her periods were not accompanied by any pain, except for headache and a painful swelling of both breasts. Nine months previous to admission to the Clinic, her menstrual periods had begun to recur at intervals of 2 weeks. Bleeding was more profuse than usual. This condition lasted about 3 months. The patient had had 2 normal pregnancies during her 19 years of marriage.

Childhood ailments included mumps, whooping cough and measles. Six years before she apparently had an acute salpingitis. She had had no other serious illnesses or operations until the onset of her present illness.

The family history was negative.

Physical examination revealed a white female, 39 years of age, 65¼ inches tall, weighing 166 pounds. The blood pressure was 152 sytolic and 94 diastolic; the respiratory rate was 16; the temperature was 98.6°F.; and the pulse rate, 96. The head was symmetrical, with enlarged malar bones and supraorbital ridges. The lower jaw was enlarged to the degree of prognathous. The eyes were negative, except for infraorbital puffiness. The thyroid gland showed no enlargement. The chest was negative; the lungs were clear; and the heart was apparently normal, except for moderate tachycardia. The abdomen was negative, except for bilateral pelvic tenderness. The hands were enlarged, the fingers spade-like and hyperextensible. The skin was cold, coarse, dry and shiny, with pitting edema of the hands and feet. The reflexes were normal. There was skeletal acral enlargement with compensatory dorsal curve of the sternum. Examination of the pelvis showed perineal relaxation; a lacerated, infected cervix; the uterus enlarged to 1½ times the normal size. Both adnexae were tender.

An x-ray film of the skull showed generalized uniform enlargement of the sella turcica, with erosion of the clinoid processes. The frontal sinuses were enlarged; the lower jaw had become prognathous. The calvarium was twice the normal thickness. X-ray films of the hands showed the characteristic tufting in the epiphyses of the phalanges.

Wassermann and Kahn tests of the blood were negative. The hemoglobin was 85 per cent (Dare method) and the erythrocytes numbered 4,340,000. The leukocytes numbered 6,750, with 65 per cent polymorphonuclear neutrophiles, 33 per cent lymphocytes, and 2 per cent eosinophiles. Urinalysis showed 1 plus albumin and many pus cells. The sugar tolerance test—137-212-236-160—showed low sugar tolerance. Calcium, phosphorus and cholesterol were all within normal limits in the blood. The basal metabolic rate was plus 4. According to the technic of Frank and Goldberger the hormone study of the blood and urine revealed a negative result of the pituitary test in the blood, and a very weakly positive test for estrin. The total excretion of estrin in the urine was extremely low, and the entire estrin cycle ran far below normal limits.

Visual fields were examined at the Episcopal Eye, Ear and Throat Hospital by Dr. E. H. Cooper. The form fields were essentially normal. The fields for red showed a slight defect below and to the right, suggestive of a lesion of that part of the left optic tract supplying the upper left retina in each eye. There was nothing to indicate any pressure upon the optic chiasm.

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* Read before the Society, February 12, 1936.

Based upon the findings, a diagnosis of pituitary tumor with acromegaly was made. Treatment by x-ray was instituted, and the patient received 17 irradiations of the pituitary gland. Her general condition improved, the headaches became less frequent and less intense, and apparently there was no further enlargement of the acral parts. Gradually, after a few months the headaches returned. Nine months after the first series, she was given a second series of pituitary irradiations by Dr. M. I. Bierman, again with improvement of the subjective symptoms.

The patient did not return to the clinic until 7 months later, July 1, 1935. She complained of abdominal pain, swelling and nausea. Examination revealed a smooth, movable, rounded mass in the right lower quadrant, which was diagnosed as an ovarian cyst. She was admitted to the hospital for operation. At operation a chronic pelvic inflammatory condition was found, with a large cystic mass in the region of the right ovary. Hysterectomy and bilateral salpingo-oophorectomy was performed. The general postoperative condition for the first 6 days was good. Following that, the course of events was progressively downward. She developed a pyelitis on July 8. The temperature rose and followed a septic course. On July 19, a pelvic abscess ruptured into the vagina. On the twenty-first postoperative day an incisional abscess was noted and drained. The pus revealed B. coli in almost pure culture. On July 27, an x-ray film of the chest showed a right subphrenic abscess. All efforts to combat the infection failed, and the patient succumbed, July 28, 1935. A striking feature of the infection was the blood picture. At no time did the white count rise above 10,000, usually running around 7,500. This is a finding so characteristic of patients with glandular disorders, that we pass it on for what it may be worth in evaluating the severity of an infection on the basis of a leukocyte count.

The mass removed at operation proved to be an ovarian cyst, which on section was found to enclose masses of corpus luteum cells.

The autopsy was performed by Dr. R. M. Choisser, with the following positive findings: Gross examination showed slight enlargement of the mandible and in the region of the zygomatic bone. There was definite prognathism. The calvarium was twice the normal thickness and showed on its inner aspect great numbers of irregular exostoses. Examination of the base of the skull showed considerable erosion of the sella turcica, due to the presence of a large tumor of the pituitary gland. This erosion extended into the anterior clinoid processes, and the posterior wall of the sella turcica was so eroded that only a thin shell of osseous tissue was left. The mass was approximately twice the size of a normal pituitary gland. The hands were characteristically spade-like, the fingers being short and the nails squared. In general, the viscera were larger and heavier than normal, and this splanchnomegaly was associated with toxic changes resulting from the acute infectious process.

Microscopic examination of the pituitary tumor sections stained with hematoxylin and eosin showed the anterior lobe to be occupied by a large mass of numerous chromaphil cells, arranged around rudimentary capillary vessels. Closer examination revealed the presence of large pale nuclei in these cells surrounded by a large amount of pink, clear cytoplasm. There were also present smaller cells containing more deeply stained nuclei with lighter colored cytoplasm. The nuclei showed no evidence of mitotic activity and suggested a benign neoplasm. The anterior lobe tissue proper was compressed by the tumor, and there was also considerable compression of the intermediate and posterior lobes, which showed no other specific pathology. Sections stained with Giemsa's stain showed in addition the presence of irregular, darkly staining granules scattered throughout the nuclei of the cells of the adenoma.

The diagnosis was chromaphil adenoma of the pituitary gland, with compression.

COMMENT

Herewith, then, is presented a case which on admission showed definite signs and symptoms of acromegaly. These may be divided into 2 groups, hormonal and mechanical. Under the hormonal symptoms, those produced by excessive secretion of the growth hormone by the eosinophilic cells were manifested in the bony and visceral changes; and under the mechanical one might class symptoms due to pressure following increase in the size of the pituitary gland, such as headache, perhaps the commonest and most persistent of the symptoms and one most frequently associated with pituitary gland disease. Headache is often present when no demonstrable enlargement of the gland is present and is probably due to increased intracapsular pressure. In this category also fall the eye symptoms, blurring, diplopia and diminution of the visual field. Should the pressure extend to the adjacent brain tissue, one might also expect polyuria, polydypsia, etc. Since the hypersecretion occurred at a time in life when the growth of the long bones was already complete, growth occurred only in the flat bones and soft tissues. Witness, therefore, the increase in the size of the hands, feet and bones of the head, and the generalized splanchnomegaly.

The diagnosis was made fairly early in the disease, and after X-ray therapy no further growth occurred. Whether this was the result secured by irradiation or a coincidental occurrence, we have no definite way of telling, since in untreated cases hyperfunction may be self-limited and followed by hypofunction. We are firmly convinced, however, that irradiation of the pituitary gland is a vital and promising tool in the treatment of many pituitary disorders, and the rationale of treatment in this case was thoroughly substantiated by the gratifying results we have had in many other cases of pituitary disorder.

To the basophilic cells of the anterior lobe of the pituitary gland is ascribed the production of the gonadotropic hormones. In this case pressure exerted by the advancing acidophilic adenoma undoubtedly caused the decline of basophilic-cell function, as evidenced by reduction of estrin and pituitary hormone in the blood stream.

The decrease in pituitary gonadotropic hormone and the presence of the large ovarian cyst may have been related. The stimulation of a graafian follicle to maturity without ovulation may result in the formation of a small retention cyst, which develops later into a cyst of greater magnitude. Follicular cytosis is a rather consistent finding in hypopituitary conditions.

It has been our privilege to present a case of acromegaly, studied at the George Washington University Endocrine Clinic. The method of diagnosis by X-ray and hormonal studies, together with the symptomatology, were outlined, as was the method of treatment by irradiation of the pituitary gland. Because of the intercurrent pelvic inflammatory disease and the poor resistance of the patient, we were able to confirm our findings at autopsy.

ABSTRACT OF PAPER READ BEFORE THE SOCIETY

"The Diagnosis and Treatment of Tumors of the Intestinal Tract,"*† **W. Wayne Babcock, M.D., Philadelphia.**

Most tumors of the intestinal tract grow in the large bowel, both benign and malignant tumors of the small intestine being rare. Benign tumors, chiefly lipomas, fibromas and myxomas, so frequently cause obstruction and intussusception that any case of intussusception occurring in an adult should first be considered as related to this cause. Particularly may recurrent attacks of intussusception with violent pain and acute obstruction lasting from a few hours to several days be due to a growth projecting into the small intestine. In Hodgkin's disease and malignant lymphomas intestinal deposits may also result in obstruction. Rarely the primary Kruckenberg tumor originates in the small bowel, the symptoms being obscured by those from the larger ovarian masses. Endometriomas may likewise invade the intestine and even cause a partial obstruction, although retrogression follows abolition of ovarian function either by irradiation or operation. Only a little over 1 per cent of all sarcomas affect the intestine, and, differing from carcinomas, hemorrhage and obstruction are unusual.

The treatment for benign and malignant tumors which are localized is usually surgical extirpation and in the small intestine resection and anastomosis, but one of the so-called aseptic methods is to be preferred. Recent improvements in the early closure of the openings left by the Mikulicz type of operation, as will be mentioned later, indicate that such a multiple-stage operation may have a place even in the removal of portions of the small intestine. Of all tumors of the intestine 95 per cent are carcinomas. Intestinal carcinoma is the second most common intestinal cancer and is responsible for one fourth of all deaths from this disease. Ninety-seven per cent originate in the colon and only 2 or 3 per cent in the small intestine. About 30 per cent develop above the sigmoid.

Varieties

Scirrhous carcinoma is usually a small inconspicuous, constricting growth occurring in the narrower portions of the large bowel (the left colon), that is, from the middle of the transverse colon to the ampulla of the rectum. It produces obstructive symptoms, such as constipation, distention, borborygmus, visible peristalsis, an acute ileus or obstruction. Adenocarcinoma is a more bulky, fungating, ulcerating tumor, growing in the expanded portions of the bowel (right colon and ampulla), such as the cecum, ascending colon and ampulla of the rectum, causing mucous diarrhea, or less frequently, obstruction. Papillary carcinoma is less common, grows large, affects the rectum and anus, causes profuse, watery and mucous dejections. Colloid carcinoma is relatively rare and is characterized by a spindle-shaped mass, annular constriction and tendency to metastasis.

Etiology

In 60 per cent the patient is a man, usually between 45 and 60 years of age, although 3 per cent occur under the age of 20. Chronic irritation of the intestinal wall, as from acid secretion, high bacterial content, adenomata, polyps, proctitis, diverticulitis, constipation and diarrhea, are favoring factors.

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* Presented before the Annual Scientific Assembly, May 6, 1936.

† From the Surgical Department of Temple University, Philadelphia.

SYMPTOMS

The most common symptoms are melena (88 per cent), constipation and obstruction (55 per cent), and diarrhea (20 per cent). An acute obstruction occurs in 12 per cent. Pain is rare in the early stages and is usually due to complications. Cachexia, wasting and anemia are terminal symptoms, and, as a rule, indicate that the patient has passed beyond the stage of cure. An exception is the early and striking anemia which may occur with cancer of the cecum.

DIAGNOSIS

The diagnosis is made by the history of a change of bowel habit, with a progressive constipation or diarrhea developing usually in middle life and by the finger in the rectum, which discloses the characteristic crateriform ulcer with raised, rolled, everted and infiltrating borders. A smaller percentage is disclosed by the discovery of a firm abdominal mass on abdominal palpation or by roentgen study after a barium enema. It is to be remembered that the X-rays usually do not show a rectal carcinoma, which is diagnosed by the finger alone. A biopsy, the procuring of which may cause perforation of a thin bowel wall, is rarely required. A morning diarrhea, which arouses the patient from his bed but which gives little trouble the rest of the day, is indicative of adenocarcinoma of the rectum; a profuse mucous diarrhea, of a papilloma or papillary carcinoma; rectal tenesmus and pipe-stem stools, of an anal carcinoma, while frequent small bloody and purulent ejections with incontinence usually presage a hopelessly advanced rectal growth. Contrasted with hemorrhoids the blood from a cancer is usually darker, more offensive, more mixed with the stool and less in amount.

TREATMENT

Early radical excision of the involved portion of bowel with the associated tributary lymphatic nodes is followed by freedom from recurrence for at least 5 years in about 60 per cent of the patients. In about 30 per cent of the cases in which the symptoms have been present for a year but without demonstrable metastasis the operation may likewise be curative. As most carcinomas of the bowel are radioresistant, irradiation is rarely advisable. A permanent abdominal colostomy is unnecessary and undesirable for an eradicable growth, although a temporary, preliminary appendicostomy or colostomy should be used if there is intestinal obstruction not relieved within 4 hours by duodenal and rectal siphon drainage. Obstruction is often precipitated by a cathartic or heavy meal.

For growths of the sigmoid or above, the affected loop is freely liberated with the attached lymphatic tissues and peritoneum, exteriorized, the wound closed about the bowel, dressings applied, the loop cut away and bulbous glass tubes with attached Penrose drains tied in the ends of the bowel. Peritonealization of denuded surfaces is unnecessary. Seven to 10 days later the spur is divided with a follow-up suture of interrupted No. 35 alloy (rustless) steel wire. Five to 10 days later without anesthesia the bowel margins are trimmed, inverted and united by additional sutures of interrupted, fine, rustless steel wire, tied with a square or surgeon's knot. No attempt is made to close the skin nor the subcutaneous fat until a barrier of firm protective granulations has been erected. To avoid hemorrhage and secondary necrosis in the later stages, only antimesenteric borders should be sutured in contact at the first stage. For a carcinoma of the rectum and rectosigmoid, the superior mesenteric or the superior hemorrhoidal vessels are doubly ligated, divided, and with attached fat, lymphatic tissue and peritoneum, the sigmoid and rectum are freely liberated to the floor of the pelvis without division. A soft tape of folded gauze 1 meter long is tied around the sigmoid well above the growth, the ends packed against the floor of the pelvis, and the abdomen completely closed. With the anus closed by suture and covered, an incision is made through the perineum to the coccyx and the gauze grasped, the liberated loop of bowel eased through and the perineal wound closed about it. After applying dressings the exteriorized bowel is cut away and a rectal tube tied in the proximal protruding end of bowel. At a later stage the intervening tissue is slit through into the anus. After 3 or 4 months a very fair degree of fecal control is obtained, especially if the lower bowel is kept empty by using a small enema every 24 to 72 hours. A secondary plastic operation to improve sphincter control is, therefore, rarely necessary. If the lower rectum is involved, the pelvic floor is removed together with the anus and attached liberated bowel, and a perineal anus formed of the sigmoid. A perineal proctectomy, except for cancers near the anus, interferes with the blood supply of the liberated bowel, is followed by sloughing and leaves a strictured, incontinent and constantly annoying anal opening. The perineal anus with an adequate opening, as when made of viable sigmoid, however, gives a satisfactory result. Should the patient have frequent annoying movements, usually the result of strictural opening and incomplete evacuation of the colon, any stricture should be dilated and a daily simple enema given to evacuate the colon, after which the patient may not be annoyed by defecation for 24 hours. The mortality, which in skilled hands should be well under 10 per cent, is increased by doing the intraperitoneal part of the operation in stages, by an attempt to peritonealize denuded areas within the abdomen, by forming a pelvic diaphragm of peritoneum and by the bacterial contamination resulting from a preliminary crushing or opening of the bowel in the operative field. Fine (35–36 gauge) rustless steel wire becomes buried without local irritation or sinus formation even when

(*Continued on page 254*)

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AMERICAN DENTAL ASSOCIATION

DR. C. WILLARD CAMALIER, *President-elect*

The American Dental Association recently held its annual convention in San Francisco, California. Much was accomplished in its deliberations which had to do with the professional, ethical and general welfare of some 40,000 dentists from constituent state associations. Reports and exhibits by the Council on Dental Therapeutics and Bureau of Chemistry, its Bureau of Public Relations and the Association's Legislative Committee, were presented. Of special news interest to Washingtonians, more especially the members of the Medical Society of the District of Columbia, was the election of one of its associate members, Dr. C. Willard Camalier, as president-elect. He will succeed in 1937 Dr. Leroy Matthew Simpson Miner, Dean of the Harvard School of Dentistry, the present incumbent.

The annual budget for the American Dental Association of $255,000.00 is expended in furtherance of its various activities; inclusive is the maintenance of its headquarters at 212 E. Superior Street, Chicago, Illinois, which houses the editorial rooms and presses for the Journal of the American Dental Association and the laboratories that have so successfully fought dental nostrums. The results of this laboratory's researches have enlightened both the profession and the public on acceptable dental remedies. Dental organizations were among the pioneers in the use of the radio for educational and health purposes. Yearly an enormous amount of material is sent from Chicago for presentation at postgraduate dental assemblies. Through its activities in creating legislation to prevent blatant quackery by corporate dentists there has been removed from the newspapers columns of advertising which on a typical page presented a portrait of a handsome "dentist" who had a purely fictitious relationship to the profession and who proclaimed loudly the virtues of "a new botanical discovery" guaranteed to prevent all pain. The coöperative spirit of the various Bureaus, notably that of the Bureau of Chemistry,* with the American Medical Association is noteworthy. Socialization of the practice of the healing arts is fought shoulder to shoulder with the medical profession. In many communities, notably in Washington, the dental profession has joined forces in the organization of medical-dental service bureaus which have proved to be effective media for solving the problem of obtaining adequate care for those in the lower wage groups.

Dr. C. Willard Camalier was born in Washington, D. C., on March 6, 1887. He was graduated from the George Washington University School of Dentistry in 1912. In his appointive and elective positions he has been a hard worker, conscientiously expending effort in behalf of his fellow-practitioners. In 1922 he was appointed a member of the District of Columbia Board of Dental Examiners, serving as Secretary thereof from 1924 to the present time. Among the executive positions held are noted: President of the District of Columbia Dental Society, 1928; President of the National Association of Dental Examiners, and for several years the chairman of the Association's Legislative Committee; Vice President of the American Dental Association, member of the Legislative Committee and the Board of Trustees of the Association. Dr. Camalier has also been recognized by reason of his work for the advancement of dentistry by the American College of Dentists, and by the International College of Dentists, in which organizations he holds fellowship. Inclusive in professional society memberships are the New York Academy of Dentistry (associate) and the International Association of Dental Research.

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* As an example the Journal, American Medical Association, quotes Bureau of Chemistry report on antiphlogistine, 1936, 107, 229.

Among the accomplishments of the new president-elect during his régime on the Board of Trustees were the adoption, upon his recommendation, by the House of Delegates of a comprehensive yet safe and sane program of educational publicity, the approval of a nationwide radio hook-up to inform the public of the aims and activities of the American Dental Association, and the establishment of a standing committee on insurance to more effectively safeguard the interests of the individual members of the profession. Dr. Camalier should prove a worthy successor to his distinguished predecessors in office. Congratulations are extended the local dental organization and to Dr. Camalier.

C. Willard Camalier, D.D.S.
President-elect, American Dental Association

NEWS AND PERSONALS

Georgetown University

Announcement of Postgraduate Courses

During the week of September 14 to 19, inclusive, the School of Medicine of Georgetown University will conduct the first of a series of annual "refresher" courses, open to the alumni of the University. The purpose of these courses will be to acquaint the graduates of the medical school with the newer developments in medicine and surgery and the allied branches which have taken place within recent years.

Monday, September 14:

- Registration at the school offices, 3900 Reservoir Road.
- Address of Welcome: The Dean, Reverend David V. McCauley, S.J.
- Scientific Program: Subject—Internal Medicine. Professor Wallace M. Yater, director.
  - "The Nephritides." Lewis C. Ecker, M.D.
  - "Auricular Fibrillation." Thomas S. Lee, M.D.
  - "Atypical Types of Coronary Thrombosis." James W. Esler, M.D.
  - "Pick's Syndrome: Demonstration of a Patient with Pericardiectomy." John R. Cavanagh, M.D.
  - "Venous Blood Pressure: Practical Value and Demonstration of Technic." Hugh H. Hussey, M.D.
- Luncheon, school cafeteria: Address by The Very Reverend Arthur A. O'Leary, S.J., President of the University.
- Inspection of medical school building.
- Scientific Program: Subject—Obstetrics. Professor Joseph J. Mundell, director.
  - "Effect of Lactation on Involution of the Uterus, and Studies on the Use of Ergot Preparations in the Puerperium." Alec A. Preece, M.D.
  - "X-ray Pelvimetry," J. Bay Jacobs, M.D.
  - "Obstetrical Analgesia." Joseph J. Mundell, M.D.
  - "A Study of Fetal Mortality in Breech Delivery." Jerome F. Crowley, M.D.
  - "A Five-year Study of Induction of Labor." Allan E. King, M.D.

The sessions on Monday will be conducted exclusively at the Medical School with the exception of an alternative course in ophthalmology by James N. Greear, Jr., M.D., at the Episcopal Eye, Ear and Throat Hospital.

Tuesday, September 15: Clinics.

Amphitheater, Georgetown University Hospital

Surgery and Orthopedics: Professors James A Cahill, Jr., and George Tully Vaughan, directors.

Children's Hospital

Pediatrics: Professor Joseph S. Wall, director.
"The Pneumonias of Children." Joseph S. Wall, M.D.
"Nephritis and Nephrosis." John H. McLeod, M.D.
"Scurvy." Robert A. Bier, M.D.
"Rickets." Mario Scandiffio, M.D.

Alternative Clinics: *Gallinger Municipal Hospital*
Orthopedics: John A. Talbot, M.D., and P. J. O'Donnell, M.D.
Surgery: Howard F. Strine, M.D., and G. K. Nutting, M.D.
Urology: William P. Herbst, Jr., M.D.

Georgetown University Hospital

Bronchoscopy and Otolaryngology: F. C. Schreiber, M.D., Waitman F. Zinn, M.D., and Harry F. Davies, M.D.

Wednesday, September 16:

Georgetown University Hospital

Scientific Program: Subject—Internal Medicine.
"Diabetes." E. Clarence Rice, M.D., and Samuel Benjamin, M.D.
Endocrine Clinic: William P. Argy, M.D.
"Peripheral Vascular Diseases." Wallace M. Yater, M.D., Philip A. Caulfield, M.D., and Thomas F. Keliher, M.D.
Luncheon, school cafeteria: Address, "Medical Socio-economics," by Henry C. Macatee, M.D. (By invitation).
"Discourse and Open Forum on Endocrinology in Relation to Obstetrics and Gynecology." Paul F. Dickens, M.D. (By invitation).

Thursday, September 17: Clinics.

Georgetown University Hospital

Gynecology: Professor Leon A. Martel and staff.
Urology: Ralph M. LeComte, M.D., and staff.

Children's Hospital

Pediatrics:
"Infant Feeding." James M. Moser, M.D., and William F. Burdick, M.D.
"Genito-urinary Infections in Children." Hugh J. Davis, M.D., and Charles P. Howze, M.D.
"Tuberculosis." H. A. Spigel, M.D.
"Pediatric Procedures." C. A. Millwater, M.D.

Alternative Clinics:
Gonorrhea in Children: David H. Kushner, M.D.
Episcopal Eye, Ear and Throat Hospital
Ophthalmology: James N. Greear, Jr., M.D.
Practical demonstrations in various types of anesthetics will be demonstrated at all clinics by the Department of Anesthesia: Thomas F. Lowe, M.D., F. E. Duehring, M.D., William J. Lally, M.D., and John J. Mattare, M.D.

Friday, September 18:

Gallinger Municipal Hospital

Scientific Program: Subject—Internal Medicine. Clinics; Gastro-intestinal Diseases: Matthew White Perry, M.D.
"Fever Therapy in Gonorrheal Arthritis." Henry B. Gwynn, M.D.
Neurology: Antoine Schneider, M.D.
"Tuberculosis." Charles P. Cake, M.D.
Luncheon: Address, "Control of Venereal Diseases," by Thomas Parran, M.D., Surgeon General, United States Public Health Service, an alumnus.
Clinicopathologic Conference: Wallace M. Yater, M.D., and Eugene R. Whitmore, M.D., presiding. An alternative course in operative obstetrics will be conducted by Professor Joseph J. Mundell and staff.

Saturday, September 19: Clinics.

Georgetown University Hospital

Surgery: James A. Cahill, Jr., M.D., Fred R. Sanderson, M.D., and staff.
Neurosurgery: John J. Shugrue, M.D.
Proctology: G. W. Ault, M.D.

Alternative surgical clinics will be held at the Gallinger Municipal Hospital by Howard F. Strine, M.D., and G. K. Nutting, M.D.
In the afternoon the alumni who so wish are invited for golf on the links of the Georgetown University Preparatory School, Rockville Road, under the direction of William J. Stanton, M.D.
The work of the week will be concluded by a dinner in the dining hall of the Georgetown University Preparatory School.

Notable foreign physicians who have recently visited Washington and been entertained by members of the Society are Dr. W. S. C. Copeman and Dr. Sir Colin McKenzie. Dr. Copeman, of London; is Honorary Secretary of the British Committee on Rheumatism. He and Mrs. Copeman made a brief tour of principal cities of the United States, Dr. Copeman read two papers before the staff of the Mayo Clinic on the subjects of arthritis and myositis. Dr. McKenzie is Director of the Institute of Anatomy at Canberra, F. C. T., Australia. He and Lady McKenzie, also a physician, were particularly impressed by the Army Medical Museum and the facilities of the Library of the Surgeon General.

It has been learned that Dr. Charles Hill, Deputy Medical Secretary of the British Medical Association will visit the United States during the last week in September. Washington is included in his itinerary. We feel sure that the officers and members of the

Medical Society of the District of Columbia would wish to extend greetings.

Dr. A. C. Christie is President of the Fifth International Congress of Radiology, which will convene in Chicago, Illinois, September 13–17, 1937. Other officers are: Dr. Benjamin H. Orndoff, Chicago, General Secretary; Drs. George E. Pfahler, Philadelphia, James Ewing, New York City, and William D. Coolidge, Schenectady, Honorary Vice Presidents. Dr. Christie has been invited to deliver the Silvanus Thompson Memorial Lecture at the Annual Congress of the British Institute of Radiology which meets in London in December.

THE DIAGNOSIS AND TREATMENT OF TUMORS OF THE INTESTINAL TRACT

(*Continued from page 250*)

used in a septic field, does not require removal, and has revolutionized results in the closure of intestinal fistulas. Even the very dangerous duodenal fistulas may now be closed with relative ease, while intestinal closure may be made at such an early stage that even resection of the small intestine by a modification of the Mikulicz procedure is now to be considered. I have not used a permanent abdominal colostomy, which is not only repulsive and annoying, but subject to stricture, associated interstitial hernia, and the protrusion of from an inch to a foot or more of mucus-covered bowel through the opening, for any eradicable carcinoma of the bowel during the last 5 years. Nor can we see any valid reason why it should be used.

For advanced ineradicable carcinoma, likewise, colostomy is rarely to be advised. By restricting the patient to a non-residue diet, by the use of mineral oil and enemas, and with the avoidance of cathartics and a resort to duodenal and rectal siphonage if obstruction develops, a necessity for the operation may usually be avoided. For the patient who is completely obstructed and at the best has only a few weeks to live it is, as a rule, better to let him die obstructed than to render him more repulsive and a greater burden to himself and friends through a colostomy. In the earlier stages when small irremovable metastases are present in the liver or lymphatics, the radical removal of the diseased bowel without colostomy is the preferable operation.

Laurence Stephen Otell, M. D.

(1896–1936)

Dr. Laurence Stephen Otell, an Active Member, died July 27, 1936. He was born on August 26, 1896, in Branford, Connecticut, receiving in 1919 the Bachelor of Arts degree from Catholic University and in 1925 the M.D. degree from Johns Hopkins University. Upon coming to Washington he associated himself with Drs. Groover, Christie and Merritt in the practice of roentgenology; later he was appointed Associate Professor of Radiology at Georgetown University. He was a pioneer in the use of Thorotrast as a diagnostic agent, collaborating with Dr. Wallace M. Yater in one of the earliest papers, "Hepatosplenography with Thorium Dioxide Sol," published in the Journal of the American Medical Association, August 12, 1933. "Thorotrast Encephalography by Cisterna Puncture" was published in the Medical Annals of the District of Columbia, December, 1933. "Herniation of the Gall Bladder" and "Thorotrast Arteriography and" Veinography" were titles of other notable presentations made before the Society. He was nominated by the Executive Committee to deliver the Kober Foundation Lecture on March 28, 1935. The subject selected was "Thorium as a Diagnostic Agent. He was active in the arrangements for the Annual Scientific Assembly, 1934. Dr. Otell was an outstanding golf enthusiast. A notable accomplishment was the breaking of the official club record for the Suburban Country Club in Baltimore in 1931. Twice he went to the quarter finals in the National Public Links Contests. His pleasing personality will be much missed by his large circle of friends and acquaintances.

Dr. Otell was a Fellow of the American Medical Association and a diplomate of the American Board of Radiology.

He is survived by his widow, Kathrine Brown Otell, and a son, Laurence S., Jr.

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PSYCHOTHERAPY IN GENERAL PRACTICE*

ELMER KLEIN, M.D.
Mental Hygiene Institute, Washington

The busy medical practitioner is apt to shy away from psychiatric problems which could well be handled in general practice. The traditional "mind shy" medical training—dealing as it does with structural and physiological disorders of one or more organs—has not given him the backing and courage which involve problems of the person's total functioning. Where the "he" or "she," not as collectivity of separate organs but as psychobiological units or personalities, is functioning so poorly as to produce profound personal unhappiness, inefficiency and invalidism or, more broadly, serious concerns on the part of the family or society, the physician is confronted with a psychiatric problem. To do justice to them the physician in general practice, who undoubtedly sees a much greater number than the psychiatrist, must be psychotherapeutically oriented. To be sure, there will be difficult or puzzling cases when he will want and need more experienced help, but a very substantial number of his cases should be accessible to a type of psychotherapy which is not too elaborate to find a place in the physician's ready equipment.

Specialized types of therapy can best be left to those dealing exclusively with psychiatric problems. Perhaps it is because these more complicated methods have sometimes been held out to the general practitioner as sources of exclusive salvation that he has sidestepped psychotherapeutic efforts in his practice. For, the busy physician who is in need of a more direct and also more inclusive psychotherapeutic method—one which deals with facts and events at their source—finds himself dealing with plastic human facts and troubles arising in a multiplicity of relations, which he has to approach with a broad pragmatic philosophy of helpfulness grounded in a common sense way of looking at facts and leading toward a collective understanding, amelioration and control.

What is perhaps more essential than over-refinements of psychotherapeutic procedure is patience and time, which the physician must give. The diagnostic urge must aim not at the finding of a polysyllabic label but the patient bringing out and gathering together of all pertinent facts which will formulate the problem of maladjustment or illness in a potentially constructive way. This requires time and a sensitization of the physician, not only to ordinary medical data but also to broad human and social facts.

The first step in this approach is an investigation of the problem seen or sensed by the patient, his family or friend. This directs attention to the following questions: "What are the facts and troubles with which the patient comes?", "Under what circumstances did they arise?", "How do they work?", "What are his reactions and their effect?" and "How can they be modified?" The patient's complaint is faithfully recorded in a simple form, and in his own language it formulates the problem needing adjustment. From it one proceeds to the factors at work, the evolution and story of the condition faced, its working and effects, keeping in mind the modifiability of the whole or its parts. In other words, a systematic effort is made to find out what is going on in the patient's mental life and behavior, why and how it is going on, where opportunities for help lie and how can this be utilized. This is a bald, common sense application of what Meyer and White have called a genetic-dynamic analysis and synthesis which emphasizes the workings rather than merely the structural status of human beings. We state in plain terms actual life reactions in such and such situations, under such and such conditions, with such and such results. The situations and findings are acted upon in the direction of a more wholesome existence and in the cultivation of a more acceptable social philosophy.

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* Read before the joint meeting of the Section on Neurology and Psychiatry and the Society, April 15, 1936.

In order to focus attention on what is essential, it is well to take up first the complaints which the patient brings us in concrete samples of his acting, living and thoughts, because they are the material which must be fitted into an acceptable and dependable program. Diagnostic and prognostic considerations in this scheme become secondary to a clarification of the patient's problems. We want to see the present in the light of a history which takes into account the patient's birth and early development through his school, social and economic adjustment, his sexual and marital evolution, his previous reactions to health problems, his habits of work and rest and sleep, his family background and his interpersonal adaptations.

The patient naturally has a flood of poorly digested impressions and experiences which have to be sifted out by means of an orderly procedure. The various factors need to be scrutinized and their share and management in the present trouble considered. Always on the level of concreteness, the patient can be shown how the various events and situations might have been handled if understood in the light of a different perspective. Depending on the responsiveness of the patient, this is brought together in a personality evaluation in which the intellectual, emotional, sexual, dynamic, sleep, social, and personal difficulties and handicaps receive consideration. The patient senses what the liabilities are and what assets there might be for a reconstructive synthesis. One should aim for a desensitization of sore points, a sensible understanding of the self and a constructive utilization of opportunities in a framework of sound life habits. Problems of personality should be formulated in language not too far ahead of the patient's capacity to understand them. This is done as objectively as possible without becoming discouraging so as to contain an ideal which will not obstruct his opportunity to be true to himself and his vision. The ideal is not some pattern of advice or preachment imposed by the physician, but the best vision offered by the patient's own material—something which he can accept and work with, now and later in life.

The rank and file of psychiatric problems show a wide range. Common ones are attitudes of inadequacy toward one's constitution, performance, or outlook; a tendency to see trouble in the attitude of others or in one's own functioning; dissatisfaction with father, mother, family or with broader social relationships; abnormal behavior resulting from a discrepancy between ambition and capacity or performance; emotional inadequacy or overresponsiveness to the various conflicts and cravings; or there may result extremes of reactions in activity tendencies or evasions and dodging of reality by means of distortions or false elaborations of thought and experience. It is particularly in the latter fields that the physician must be alert to potentially suicidal or antisocial trends and possibilities and take precautions in the form of adequate supervision or institutionalization. The types of cases the general practitioner is most apt to see are varying degrees of depressive and anxiety states with variable somatic involvements. It is important in all examinations to give the somatic symptoms the attention they deserve so that factors which are physiologically or structurally accessible may be singled out for the tools of the surgeon or of chemistry and bacteriology.

I should like to embody these general statements in a more concrete form by the brief presentation of 2 cases to illustrate the problems, method of investigation and psychotherapeutic procedure.

The first case is that of a 34-year old housewife complaining of "nervousness," emotional upsets, headaches, feeling of tightness in the throat and pain in the back. There were in addition frequent crying spells and dread of losing her mind, suicidal thoughts, insomnia and fatigue.

The symptoms of headache and insomnia developed about a year before coming to the physician when she worried over her husband's temporary loss of his job. At that time the pain in the back which she had had for years became worse and even more accentuated after the extraction of 2 teeth which had been done upon medical advice She fainted and remained unconscious for 2 hours when this was done, and afterward there was a feeling of fatigue with any effort and more severe headaches usually starting in the back of the neck. A few months before coming to the physician she overheard a woman say that unless she menstruated she would lose her mind at the time of the menopause. She had been brooding over this with the additional worry that a paternal granduncle was insane. There was ample opportunity for this brooding, since her husband by that time had gotten a job but worked until midnight. She was all alone in the house when 2 burglaries had occurred in the neighborhood, on account of which she felt very uncomfortable and insecure. With her brooding, pains and discomforts, she became tense, irritable, dissatisfied and disagreeable, so that she had lost interest in her job as a saleswoman—a job she took in order to get away from her worries. She gave this up and lost interest in her social contacts, church and amusements.

She was a woman who was practically always healthy and well except for some kind of fainting spells between 13 and 15 and for an abdominal operation when she was about 16 years of age. She was told that her ovaries had been removed and although she never had a single normal menstruation, her sex urge and satisfaction had been normal. It was in connection with her amenorrhea that the remark about insanity was made. Influenza in 1919 left her an aching back.

In her family background apart from the psychotic paternal granduncle, there was a high-strung father, and nervous, excitable older brother and sister. Before coming to the physician, she had had physical investigations in medical, orthopedic, gastro-intestinal and gynecological clinics, which revealed no findings to account for her symptoms.

What we have here is an anxiety state with depressive features in an emotionally labile woman, in whom various somatic and vegetative symptoms, appearing first with worry over her husband's loss of job became more fixed after a kind of dental panic and with a loss of life interests and increased anxiety tension after hearing some injudicious remarks about the possibility of her becoming insane. Her solitary home life made conditions ideal for dwelling and brooding on these topics.

In the management of the case, the patient was first told of the negative findings of the various clinics. The story of the development of her troubles was restated to her in much the same words as it was just formulated, emphasizing to her that her symptoms were situationally determined, illustrating this psychological principle to her by a few examples (headaches with worry, mouth getting dry in stage fright, heart palpitation with fright or anxiety, etc.). She was reassured that her fears of insanity were largely groundless. The desirability of making some sort of arrangement with her family whereby she would have some helpful contacts and would not be thrown so much on her own company, the management of time through doing her housework and a reviving of her interests in her church going, etc., was outlined. A week later when seen the patient showed a spirit of encouragement. She had made arrangements to have a member of her family live with her, and she had again started to participate in those activities (church and club meetings) which were a part of her normal daily program before her anxiety state developed. Her sleep, appetite and feeling of fatigue were greatly improved, and the only manifestation of emotional tension was brought out by a necessary visit to the dentist. Further dental work made necessary by a swollen, painful jaw interfered with her general convalescence, but after 2 months of weekly visits she was greatly improved. During each visit there would be a checking up of the initial complaints with a gratifying emphasis on points of improvement and a frequent reformulation and reëxperiencing of her problems in the light of a newly gained and more wholesome vision. After 3 months the patient reported that she was able to do a large share of her housework, attended church and enjoyed it, had had no crying spells and no thoughts of suicide, and was sleeping well.

The other case is that of a 20-year old intelligent stenographer, who sought help for a right-sided tic, insomnia and slump of energy. She came of rather unstable stock, the instability varying from convulsive attacks in a younger sister and labile fever-reaction of a younger brother to excitability and worrisomeness of the father. The girl herself had a tendency to keep her troubles to herself and then fret and worry about them. She was subject to nocturnal fears. While she was in high school, under circumstances of tension, she developed a kind of twitching of the nose, or nasal mannerism, which would come and go as the situation eased up. At 17 she went to work as a stenographer and had been doing efficient work until the present trouble, which came on some 6 months before she sought medical help. At that time, after witnessing her sister's convulsions for the first time, she became greatly upset and worried. There was associated with it a gradually oncoming tic and a noticeable energy let-down. Then there came new worries and frictions, worries about her fiancé going around with other girls, and friction with parents about her prospective marriage. About 3 months before she was seen, she married the man whom her parents opposed, and while there was a superficial acceptance of the fact, the mother of the patient continued nagging and annoying and upsetting her with gratuitous warnings and solicitudes in connection with her husband. The tic became more widely spread, she became more irritable and ill-composed with increasingly poor sleep, frequent crying spells, poor appetite and some weight loss. The resentment and friction of the mother's interference usually aggravated the tics, and with a ventilation of her troubles respite would usually take place. The tic interfered with her concentration in her work, which she finally had to give up. In addition to the twitching, after marriage she developed dysmenorrhea and frequency of urination.

This story represents a reconstructed picture of the patient's and the mother's statements. After it was obtained, she was referred to a gynecologist for consultation as to the dysmenorrhea and frequency of urination. The dysmenorrhea was explained by the gynecologist on the basis of an antiflexed uterus and a firm cervix, and the urinary trouble on the grounds of high urine acidity. The gynecologist stated that pregnancy would probably overcome the antiflexion, and she was given alkalis for her high acidity.

The next step in the treatment was undertaken by the psychiatrist. The story was restated to both the mother and the patient together, using insofar as possible the statements and concrete examples offered by both. The résumé pointed to the existence of a constitutionally unstable background, making for a favorable soil for the development of the twitching in which the fright and anxiety about the sister's convulsions played the important initial rôle. But its continuance, together with the depressive symptoms, was produced by the mother's meddlesomeness in the patient's marital affairs and continued opposition to her choice with the consequent emotional upsetting that this was causing. On the other hand, the patient's inability to talk over her worries and difficulties in a helpful way was drawn in to show that it probably aggravated her condition. The mother was urged to accept the marriage, since it was an accomplished fact and working out well, and not to meddle in her affairs since the patient was capable of handling her responsibilities. The girl, on the other hand, was led to see the need of sharing her troubles and worries to avoid the brooding to which her isolation led and to seek whatever helpful council her husband and mother could give. The gynecological and bladder conditions and findings were restated and the possibility mentioned that in the production of her urinary symptoms, her anxiety and depressed state might play a rôle. Next, she was given a program of activity for the 24-hour period in which a certain amount of work, recreational activity, sleep and rest were outlined. A mild sedative was given to lessen the tension and help her sleep. At the same time the husband was urged to give up the well-meant but harrying exhortations about "snapping out of it" and helped toward a more understanding attitude. The patient continued to be seen about once a week with an early remarkable subsiding of the motor tics. An attack of twitching came on when she was in a condition of excitement watching the races with her husband. After this fact was restated in the light of her constitutional background, she decided to avoid recreations that might lead to similar emotional stirring up. Within a month her motor and gynecological condition cleared up, and her sleep and appetite were very much improved. Within 2 months she gained in weight, slept much better, there were no longer crying spells and she was able to return to her former work.

In both these cases the patient's difficulties, as so often happens, are seen to be a part of a larger family or social problem. Indeed, the management of the family situation in both cases was perhaps the most important therapeutic step. One has to recognize that we operate with responsibilities and opportunities that extend beyond the patient in a medium of social interrelations calling for a social vision. Collaboration was necessary, too, by the various physicians attacking the psychiatric and somatic problems. In neither case was there any need or effort to go beyond the homely facts which any physician could have handled. The sources of the trouble were near enough to the surface to be seen and understood by the patients, so that an understanding of their operation and the remedies came not as something imposed or artificial, but as logical and natural. The history was recounted in terms of the facts and situations described by the patients themselves and as it was supplemented by the family and by medical collaborators, stressing the potentially modifiable components. Kept in this way close to the language of the patients, the facts were better exposed to correction, and the story of the sickness was closer to the facts than if they had been cast into some obscuring and partially understood terminology. And by keeping the complaints as the center of the problem of evaluation and help, the various steps of therapy lent themselves better to checking and control. Ventilation of the difficulties—a socialized sharing and communication with the physician as well as with members of the family—made for a drawing in of possible helps and modifications and the formation of a better perspective of the past and for future action. Reassurance was given when it was necessary to dispel the groundless beliefs (the fear of the one patient that an ovarian operation would result in insanity and in the other that her tic was so-called organic) interfering with the possibility of a constructive readjustment.

In cases of depression particularly, it is essential for the physician to substitute in place of the urgings and exhortations of the family and friends which merely harass and further upset the patient, an understanding attitude and a wholesome régime of activity, rest and diversion. He must, of course, pay attention to the vegetative functions and to available pharmacodynamic and hydrotherapeutic helps. The physician reformulates to the patient the condition and its development in such a way that the problems which preoccupy him are reduced to a juster perspective. He is brought to accept the fact that he is a sick person and is led to see that the troubles which loom so overwhelmingly take on their proper size by seeing them through an emotionally sick outlook. We then help to promote in him a capacity to substitute for his distorted partial or fixed statement, a view that does justice to a wider range of responsible factors—one containing the elements of a reconstructive outlook.

In reactions of hate, aversion, fear and more rigid depressions, the emotional-associative patterns often become fixed and inaccessible to frontal attack. To avoid defense attitudes, argument should be avoided, and through neutral topics first, problematic points are approached with a gradual inclusion of the fixed and sensitive views. At times the patient's dreams and unchecked fantasy are utilized in getting new slants, and the physician's skill and imagination find challenge in mobilizing the patient's resources toward a more wholesome goal.

To sum up what has been said about the treatment of human pathology in general practice: It is urged that with a pluralistic approach to its problems the general practitioner can and should handle the rank and file of the less puzzling and less difficult psychiatric problems. His needs for this are organized common sense, trained experience, and the helps that science offers, together with a social vision of amelioration.

PSYCHOANALYTICAL REMARKS ON THE CLINICAL SIGNIFICANCE OF HOSTILITY*

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In the preceding paper on "The Psychopathological Significance of Hostility"* Dr. Hadley discussed the enormous influence hostility has on every human being's biological and emotional life, be he sick or healthy. As to its clinical significance hostility indeed gives rise to many pathological conflicts. Let us see why.

Modern social life is on the one hand more or less unconsciously based on general competitive hostility. On the other hand, modern people's conscience is consciously orientated on the commandments of Christian morality demanding general charity toward everybody. Thus, we live through a constant conflict between our hostile tendencies against an inimical environment or even toward simultaneously beloved persons on the one side, and between our conscience's demands of loving our neighbors as ourselves on the other. In addition, people's ill will against their neighbor makes them feel insecure from fear of hostile retaliation.

These conflicts start in early childhood when children first have to deal with hostility and competition in their family environment and when they have to stand their beloved parents' training efforts which show as antagonism toward their infantile longing for exclusive pleasure; they will answer it by feeling resentful toward their parents without discontinuing to love them. Thus "ambivalence" (that is to say, the capability of simultaneously liking and disliking persons and things and the disability of exclusively loving them) rises as a general feature of human emotional life. It is most decidedly developed in early childhood and later on decreases but never disappears.

If the tension between the hostility and the commandments of charity, between love and hatred that one adult person feels toward another, becomes by some or other reason so intense that he cannot stand the constant conflict which is raised by this antagonism, hostility will be repressed. Very often this repression will not be successful. In this case the person may escape from a reality in which he is constantly submitted to the conflict between his hostility and his blaming conscience and to the fear of retaliation, into the unreality of sickness (psychoneurosis or psychosis), and he may express his incompletely repressed hostility by psychogenic physical or psychic symptoms. By these means repressed hostility and ambivalence give rise to many nervous and mental diseases.

Let me give one clinical example of its etiological significance from the group of organ neuroses, namely migraine, one from the group of psychoneuroses, namely agoraphobia, and one from the group of psychoses, namely melancholia.

Experience with 8 cases of migraine (each of which I treated and studied an hour a day for a year or longer) has given me the following impression: they all were persons who due to their hypersensitive conscience, due to their fixation on very cultured and somewhat conventional old families with a particularly strong moral family standard, or due to the intense destructiveness of their hostile tendencies, could not stand their ambivalence and, therefore, tried to repress their hostility. This repression was not totally successful, and, therefore, the hostility expressed itself by the physical symptoms of migraine.

In order to understand our patients' ability of expressing emotions by their body I should like to recall our experience with healthy persons' equal psychophysic mechanism. Little children, e.g., express their troubles and their wishes, before they are developed enough to talk, by shouting, crying, vomiting, etc. Healthy adults sometimes also express, as we know, emotions, wishes and feelings by bodily changes, e.g., by blushing, heartbeating, diarrhea, etc. Neurotic and psychotic patients are using the same mechanism if they do not succeed in totally repressing forbidden emotions and wishes, thus building psychogenic physical symptoms, so-called conversion symptoms.

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* Read before the Section on Neurology and Psychiatry of the Society, November 7, 1935.

Coming back to the symptoms of migraine, they are, as we know, unilateral headache, scintillating scotomata or other visual disturbances, nausea, retching and vomiting, intestinal disturbances, namely, spastic constipation sometimes ending in diarrhea, urine retention and attacks of chilliness and pallor which may be unilateral. Strikingly enough, all these different symptoms are produced by the same functional mechanism, that is, by spasmodic muscular contractions of involuntary smooth muscles. The headache, the visual disturbances, nausea and vomiting and urine retention are caused (due to sympathetic irritation) by spasmodic contractions of the smooth musculature of cerebral blood vessels which cause in turn ischemia and edema irritating the brain as a whole and its centers. In addition to the central muscular spasms, the chilliness and the pallor of the skin are caused by local vascular spasms, constipation and diarrhea (due to vagus irritation) by the activities of the smooth muscles of the bowels, retching and vomiting by cramp-like contractions of the muscular system of the diaphragm and of the pylorus, urine retention by spasms of the muscular system of the bladder.

In order to make us understand this mechanism as an expression of unconscious hostility I want to recall the fact that conscious hostility is also physically expressed by our skeletal muscular system. Does not the man who feels enraged against his enemy wish to assault him? And since this real physical aggression is usually forbidden within our culture, does he not at least contract those muscles by the activity of which he could hurt his adversary? Indeed he does! He clenches his fist, gnashes his teeth, kicks at the hated person, etc., i.e., he contracts the respective voluntary striped muscles.

Thus, the migraine patient's repressed hostility toward a beloved person is expressed by spasmodic contractions of his involuntary muscular system which obeys only unconscious impulses, on the same principle as an average healthy person's hostility is expressed by contractions of his voluntary skeletal muscular system that obeys conscious impulses.

(By the way, we may note in this connection the muscular cramps and convulsions in epilepsy and its close relationship to migraine. Psychoanalysis considers these epileptic convulsions also to be an expression of the epileptic's hostility.)

Let me quote a case illustrating this mechanism in migraine:

> One of my patients tells the following history about the development of her migraine attacks: "We were raised with the law: We family members belong together and love each other, as if that was the eleventh commandment, and when a child I consciously obeyed this law very strictly. However, as I know today, I secretly hated my mother with all my heart because of her enormous family pride and especially because of one fundamental proof of it she gave me: she would not take care of me when I was ill, because her family vanity made her imagine that no family member ought to be ill at any time. But she heartily enjoyed taking care of invalid persons who were not family members. We children had to help her at this job. Consciously I admired mother's procedure very much, however I became secretly furious whenever I had to pay a visit to one of her protégés, and I regularly came home with a migraine attack."

After acquiring insight into this mechanism and after having worked it through psychoanalytically the patient got rid of her migraine attacks like 4 other patients who showed similar mechanisms. Two others secured decided relief as to the number and intensity of their attacks, and only 1 remained practically uninfluenced.

In describing this psychogenic mechanism of migraine and its main symptom headache, I do not mean to overlook the well-known fact that common headache very often also arises as a conversion symptom expressing anger, rage or hatred.

However, although nearly every neurotic as well as a so-called healthy person may occasionally express an attack of anger or hatred which is more or less temporarily or more or less superficially repressed or even only suppressed, by producing an attack of common headache, I have the impression that migraine always seems to be one specific expression of deeply repressed continuous hostility against beloved persons, that is to say, the specific expression of unresolved ambivalence.

Let us now see about the etiological significance of unconscious hostility in a psychoneurosis, namely agoraphobia. The patients suffering from agoraphobia are as we know fearful and, therefore, unable to walk alone in streets and open places. They are only capable of doing this if somebody is with them.

Formerly we tried to understand this anxiety as a result of the patients' fear of the sexual "Dangers of the Street." Recently, however, psychoanalysis has shown that this interpretation does not suffice, but that agoraphobic patients also suffer from intense unconscious hostility toward a person whom they consciously love or whom they are at least supposed not to dislike. The agoraphobic symptoms, however, are not so much a direct expression of the patient's hostility as the migraine symptoms are; according to my experience they are secondarily caused by the agoraphobic's fear of retaliation and punishment for his hostility. Due to this hostility he in phantasy wishes to injure or even to kill the beloved and hated person. According to the magic way of unconscious mentation the patient does not feel any difference between the thoughts and wishes he has in his unconscious mind and their real fulfilment. So he unconsciously believes that his evil wishes will be fulfilled. Wishing evil, he fears retaliation. Therefore, he is afraid to walk alone and to deal by himself with the real dangers of the street which may turn against him for punishment and retaliation, and he only feels secure and protected from its dangers if somebody is with him. When accompanied he, therefore, succeeds in crossing the dangerous streets and places.

One of my patients, e.g., daughter of a psychotic mother whom she hated, wished secretly to kill her. Naturally this hatred and this wish were very deeply repressed and unconscious until analysis revealed them.

"If I leave mother," she reported after this unconscious experience became conscious to her, "mother will die due to my wishes. On the other hand, I cannot wish mother's death, first because you are not allowed to hate your mother and you are certainly not allowed to kill her, then because father would punish me by wanting me to die, too; and his death wishes would certainly kill me."

When the agoraphobia of this patient began, the only way of getting her across a street was for her father to accompany her. Later on, she was also able to walk if a substitute accompanied her. After the disclosure of her emotional conflicts the patient recovered.

Deutsch and other psychoanalytic authors add another explanation. According to their theory the agoraphobics can only cross streets when somebody else is with them because they take the companion as a substitute for the person toward whom their evil wishes are directed. Having this person himself or his substitute unhurt with them the patients feel the reassurance that their injuring wishes against him are not fulfilled, thus feeling at the same time relieved from feelings of guilt and fear of retaliation.

Now, let us consider an example of the etiological significance of hostility in psychoses, namely melancholia.

The symptoms of melancholia are, as we know, the patients' deeply depressive mood, lack of self-confidence and strong self-reproaches, sleeplessness, refusal to eat, fear of impoverishment, and suicidal tendencies.

What do these symptoms mean? As we know from our analytic experience, the melancholics are persons whose love life remained undeveloped, or who, due to a strong emotional conflict which is primarily responsible for their depressive and mournful mood, started again to react according to the laws that were active in their early instinctual development. This emotional conflict may be represented by the loss of a beloved person, or by the real or imagined loss of his love, or by any experience that made them face their own loving disability.

Due to their regressive instinctual life the melancholics also feel extremely ambivalent, not only toward other persons like the neurotic and psychoneurotic cases we discussed before, but also and very decidedly so toward themselves. They symbolically demonstrate their suffering from this poor love life by complaining about their fear of impoverishment, meaning consciously their material impoverishment and unconsciously their fear of being bare of active and passive love in regard to themselves and to other persons.

As to their hatred against themselves which shows by their conscience's constant disapproval of themselves, it finds its main expression in their intense self-accusations and their tendency of depriving themselves of basic life necessities like sleep and nourishment.

At the same time these symptoms serve the unconscious purpose of ruling over and tantalizing the patients' surroundings which they expect to continually comfort them, to talk them out of their self-reproaches and to take care of their neglected physical requirements. Thus, their self-reproaches have the additional real contents of reprimanding themselves for their sadistic tendencies toward their surroundings.

The early and primitive state of the melancholics' emotional life has still another consequence. Instead of loving or hating other persons as such, the melancholics deal with their feelings toward these persons—to say it in psychologic terms—by identifying with them, which means biologically, by introjecting them, or by swallowing these persons in phantasy. (In order to understand this unconscious mechanism we may think of primitive people who really swallow a person's body or parts of it if they want to incorporate beloved or hated persons' character qualities. They eat, e.g., a brave chief's heart, thus incorporating as they believe the dead chief's bravery.)

Since the melancholics feel by these means identical with the swallowed person, their self-accusations have the secret additional contents of blaming on the incorporated persons everything they consciously accuse themselves of.

The same mechanism holds on the melancholic's suicidal impulses. On the one hand, they are the final conscious expression of his ambivalence against himself; on the other hand, they unconsciously mean at the same time murdering impulses against the incorporated person, who, being identical with him, is supposed to be killed with him if he commits suicide. Since homicidal tendencies are mostly forbidden, even more than suicide, they remain unconscious, and the melancholic consciously knows only about his suicidal impulses.

One analyst's patient responded to this insight he gained in the course of his analytical treatment by bringing a knife into his analytic hour and attempting to kill the analyst rather than himself.

Other melancholics in phantasy murder their friends, relatives or physicians, as it were, by committing suicide, because they hope to make them feel guilty and miserable forever.

"I thought of killing myself," said one of my patients, "but I did not feel sure enough that you would mind it."

I realize that this short description of the very complicated unconscious mechanism in melancholia as verified by psychoanalytic research work done on many cases (Fenichel) may not appeal especially to those colleagues who usually will not deal with psychoanalysis. I hope, however, that I have at least succeeded in showing on principle how unconscious hostility becomes the reason for developing this psychosis, just the same as it does in a great number of psychoneuroses, as in our paradigm agoraphobia and in many organ neuroses, such as migraine.

BIBLIOGRAPHY

Deutsch, H.: Psychoanalysis of the Neuroses. London, Hogarth Press, 1932.

Deutsch, H.: Zur Genese der Platzangst. Internat. Ztschr. f. Psychoanal., 1928, **14**, 297.

Fenichel, O.: Outline of Clinical Psychoanalysis. New York, Norton, 1934.

A SPORADIC OUTBREAK OF NEONATAL PNEUMONIA WITH ACCOMPANYING SKIN LESIONS DUE TO STAPHYLOCOCCUS ALBUS HEMOLYTICUS*

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It has for long been recognized that mothers delivered in maternity wards of general hospitals, and indeed in special obstetrical hospitals, are on occasion subjected to certain risks that do not obtain in their delivery with modern technic outside of an institution. The cause of childbed fever since the days of Semmelweis and our own Oliver Wendell Holmes has been recognized. However, the insufficiency of present means of altogether combatting this disease is suggested by the recurring articles in the literature pertaining to this type of infection. The pros and cons of delivery of the mother in the obstetrical department of a general hospital were recently discussed by DeLee. The new-born baby suffers in a like manner risks that are inherent upon his arriving in an institution equipped for obstetrical work with nurseries appropriately located for caring for the "by-products." It is no secret that in these institutions often impetigo may be considered endemic, repeated outbreaks of the diarrheas occur among new-born breast-fed infants, and multiple respiratory infections at times prevail. Generally the causes are known but relief does not appear to be entirely at hand. Quoting from Margret Warwick's article in the American Journal of Medical Sciences, pneumonia as a cause of death in the new-born is relatively common. Cruikshank, in 800 investigations of the cause of neonatal deaths, found 197 cases (25 per cent) of pneumonia. He concluded that it is the most common of infective lesions causing death during this period.

My attention to the particular outbreak under discussion, which I believe has somewhat unusual features, was directed through seeing at home a baby† newly arrived from the hospital who presented crusty scalp lesions, refused to nurse, and had marked respiratory distress. Death followed and a necropsy was obtained; later, on Dr. Harry A. Ong's service at Children's Hospital and on which service I was at the time attending physician, other cases presenting strikingly similar features were seen in infants all under 3 weeks of age that had been born in the obstetrical department of the same institution within a 60-day period. Necropsies revealed multiple lung abscesses. Pustular lesions of skin were a common factor. The Staphylococcus albus hemolyticus was reported as being recovered in pure culture by Drs. J. W. Lindsay and E. Clarence Rice‡ from all cases coming to necropsy. Other members of the staff reported seeing similar cases. Every facility for viewing charts and studying the situation at the general hospital was afforded me by Dr. Charles S. Cole, the Superintendent.

In the months of July and August, 1930, there were a total of 339 deliveries of different mothers of 341 babies. One hundred and eighty-six charts were closely surveyed, and pertinent data concerning the remainder were at hand. The Health Office allowed me free access to mortality records. By comparing names of babies delivered with local mortality records, deaths were revealed. However, it should be stated that a number of parents resided beyond the limits of the District of Columbia; as a consequence this mode of investigation would not furnish mortality data concerning this group.

In the obstetrical section of the hospital, which is in a separate adjoining building from the several general wards, there are normally two nurseries, one on the fourth floor with a premature room and another on the first floor. The third floor at the present time affords space for isolation of 3 babies. A third nursery in a classroom with isolation cribs was available during the summer in question. The distribution in July and August, 1930, was as follows: 169 babies, fourth floor; 153 babies, first floor; 11 babies in classroom. The wearing of gowns, with strict isolation of ill babies prevailed. ST37 was used on the skin following baths. The charts revealed there was a total of 38 cases with respiratory infection. A summary of sickness gleaned from the charts among 186 babies with the therapeusis adopted is shown in Table 1. The hospital was most active in attempting to institute measures to prevent spread of infection. Drs. J. C. Eckhardt and P. A. McLendon were pediatricians in charge. Dr. O. B. Hunter made bacteriological investigations. Dr. James G. Cumming of the Health Department was freely consulted. These gentlemen were most coöperative in this study. Through Dr. Cumming, Chief of the Bureau of Contagious Diseases, Health Department, much of the data included were obtained. An item of interest is that a reservoir of infection was

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* Read before the Society, October 30, 1935.

† See "Baby K" in Table 3.

‡ "Cultures from lungs in all of the cases referred to in this paper, coming to autopsy at Children's Hospital, showed a Staphylococcus albus hemolyticus. The majority of these cases also showed the same organism in the heart's blood culture." Substance from a personal communication from Dr. E. Clarence Rice, who with Dr. J. W. Lindsay performed the necropsies.

TABLE 1

DATA SUGGESTING RESPIRATORY INFECTION*

	NUMBER OF BABIES
Temperature 102°F. and above	27
Temperature 100°F. to 102°F.	16
Labored breathing	4
Pustular skin lesions	11
Therapeusis suggesting respiratory infection:	
Treated by—	
Camphorated oil	6
Witch hazel sponge	30
Tepid sponge	2
Benzoin inhalations	4
ST37	65
Silver nitrate, local applications	5
Nose drops:	
Mistol	16
Menthol	17
Argyrol	36
Menthol and argyrol	8
ST37 and Mistol	4

* From survey of 186 charts.

TABLE 2

INTRAMURAL DEATHS, BABIES, JULY AND AUGUST, 1930

NAME	BIRTH	DEATH	CAUSE
*O'B	7/ 4/30	7/ 6/30	†Congestion of brain present at birth
*Ed	7/18/30	7/27/30	†Cerebral hemorrhage, starvation
*AA	7/19/30	7/22/30	†Unknown
Ho	7/20/30	7/23/30	†Inanition, exhaustion, extreme heat
*Cu	7/20/30	7/25/30	†Icterus neonatorum, inanition, heat prostration
Ka	7/21/30	7/27/30	†Intracranial hemorrhage, prolonged labor
Da	7/22/30	7/23/30	†Infarcts, cysts, placenta
Su-twins	8/15/30	8/16/30 8/21/30	Prematurity (hospital record)
Ma	8/ 9/30	8/ 9/30	†Prematurity
*G	8/ 9/30	8/ 9/30	†Prematurity, pyelitis
*Co	8/18/30	8/19/30	†Convulsions due to brain irritation

EXTRAMURAL DEATHS, BABIES, SEPTEMBER, 1930

NAME	BIRTH	DEATH	CAUSE
Bo	8/11/30	9/28/30 CH	†Pyloric stenosis
Ja	8/16/30	9/11/30	†Convulsions, malnutrition

Stillbirths, July and August, 1930	11
Summary of non-respiratory deaths, babies born in July and August	14
Total	25

* Fourth Floor Nursery.

† Health Department Mortality Record.

CH, Children's Hospital.

found by these investigators in the throat of a colored maid who was said to have been harboring the Streptococcus hemolyticus.

One hundred and three different obstetricians attended the 186 confinements. In passing it might be added that of these, 5 were recognized obstetric specialists and their total deliveries amounted to 75. Of no little importance were the weather conditions during July and August. In July the mean temperature was 80.4°F. against an all-time mean of 77°F. The highest temperature during the month was on the twentieth when it reached 106°F. The lowest was on the sixteenth when the temperature sank to 56°F. The humidity for the month was 69 per cent. In August the mean temperature was 76.8°F. against an all-time mean of 75°F. for the month. The highest recorded was 100.2°F. on the fifth; the lowest 55°F. on the thirteenth. The average humidity was 70 per cent.

Reference is now made to Table 2. A tabulation of intramural deaths is given, including stillbirths and what appeared to be non-respiratory deaths.

In Table 3 will be seen tabulated mortality records of babies born during July and August* showing birth and death dates. All had respiratory infections, many of whom had infective skin lesions.

TABLE 3

Babies, Most with Skin Infections, All with Lung Infections of Fatal Termination

Born in the months of June, July and August, 1930

NAME	SEX	BIRTH	DISCHARGED	DEATH	PLACE	FINAL DIAGNOSIS
*MC	F	6/ 1/30	6/13/30	6/19/30	Home	Bronchopneumonia
†PM	F	7/11/30	7/23/30	12/31/30	Home	Lobar pneumonia; otitis
*LB	F	7/12/30	7/22/30	8/ 3/30	CH	Bronchopneumonia; otitis
*EH	F	7/22/30	7/30/30	8/11/30	CH	Bronchopneumonia; diphtheria carrier
*NH	F	7/30/30	8/ 8/30	8/24/30	CH	Bronchopneumonia; furunculosis
*JK	M	7/30/30	8/12/30	8/16/30	CH	Pneumonia with abscesses
*H	M	8/ 4/30	8/17/30	8/22/30	CH	Pneumonia with abscesses, L. and S.
*SW	M	8/ 7/30	8/16/30	8/19/30	CH	Bronchopneumonia; cardiac dilatation
*MH	M	8/ 7/30	8/18/30	8/24/30	Home	Lobar pneumonia; toxic ileus
*PAS	F	8/ 6/30	8/14/30	8/28/30	CH	Bronchopneumonia with abscesses
*RGB	M	8/ 9/30	8/26/30	8/31/30	CH	Capillary bronchitis; pustules

* From the Fourth Floor Nursery.

CH, Children's Hospital.

† Included as item of interest, not counted in neonatal deaths.

The stillbirths added to the neonatal deaths of which a record has been obtained totals 35. This against a total of 341 births gives a mortality exceeding 10 per cent. In the registration area the neonatal deaths plus stillbirths fluctuate around 8 per cent.† The respiratory neonatal deaths were accountable for 28.6 per cent of the total mortality.

A brief summary of clinical records with necropsy data of cases listed in Table 3 follows:

Case 1: M. C., a white female, born June 1, 1930 (Drs. H. A. Ong and H. F. Kane). Forceps (prophylactic). Weight at birth was 8 pounds, 2½ ounces; upon discharge, 7 pounds, 8 ounces. On June 10 the baby had a slight cold; on June 11 there was difficulty in nursing owing to cold in head; June 13 the baby had cold in head, "coarse throat râles," stomatitis. Both breasts were swollen and red; some secretion, no fever (Dr. Ong). Death occurred on June 19, 1930, bronchopneumonia given as cause; no necropsy.

Case 2: P. M., a white female, born July 11, 1930, first floor nursery. Died at home on December 31, 1930; lobar pneumonia given as cause. Dr. T. B. Crisp reports that death followed a fulminating respiratory infection. Chart was unobtainable. This is not classed as a neonatal death, but the interesting facts are the cause of death and the birth during the infective period in the hospital.

Case 3: L. B., a white female, born July 12, 1930 (Drs. R. L. Spire, obstetrician; C. A. Schutz, pediatrician). Birth weight was 6 pounds, 9 ounces. On August 1 the baby began to cough a little, was fretful; became cyanosed on August 3; entered Children's Hospital, dying the same day (August 3). Some macules and papules over forehead on right side, breathed with an expiratory grunt and rapidly; many moist râles; otitis media. No necropsy.

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* Exception, 1 baby born in June is noted.

† Birth, Stillbirth and Infant Mortality Statistics, 13th Annual Report, United States Bureau of Census, Part 1, 1931.

Case 4: E. H., a white female, born July 22, 1930. Weight at birth was 7 pounds; discharged on July 30 weighing 6 pounds, ¼ ounce. Date of admission to Children's Hospital, August 9; date of death, August 11, 1930. Temperature on July 24 was 102°F. On July 25 condition seemed good; was getting "witch hazel" sponges. On July 28 a soda irrigation was given. Somewhat cyanosed. No nasal discharge at any time. On August 9, at the age of 3 weeks, the child appeared acutely ill; breathed with an expiratory grunt and rapidly; note on percussion was impaired over left side of chest posteriorly. Many moist râles were heard over chest posteriorly. Small red papular rash over body and face. On August 10 the child was much worse; very cyanotic; found to be a diphtheria carrier; sent to isolation ward. On August 11 respiration ceased at 12:15 A.M. X-ray of chest (Fig. 1) revealed some opacity of the left upper lobe, probably a beginning pneumonia with general involvement of the bronchi similar to a bronchopneumonia. No autopsy.

Case 5: N. H., a white female, born July 30, 1930 (Drs. E. W. Nicklas, obstetrician, and P. A. McLendon, pediatrician). Weight at birth was 7 pounds, 9½ ounces; at discharge 6 pounds, 12 ounces. Temperature on the fifth day was 103.2°F. ST37 sponge given. Entered Children's Hospital on August 23 and died on August 24, 1930. Abscess on head incised; transfused. Guinea-pig injected on August 20, died September 3; blind 1 week. Dr. Lindsay's necropsy on guinea-pig showed lower lobe of lung consolidated anteriorly and inferiorly; a depression in this area suggested ulceration. Sections of lung showed vessels generally distended and numerous sharply localized leukocytic infiltrations (inflammatory). Anatomical diagnosis was foci infection with abscessed lungs. Culture of abscess of head, Staphylococcus albus hemolyticus.

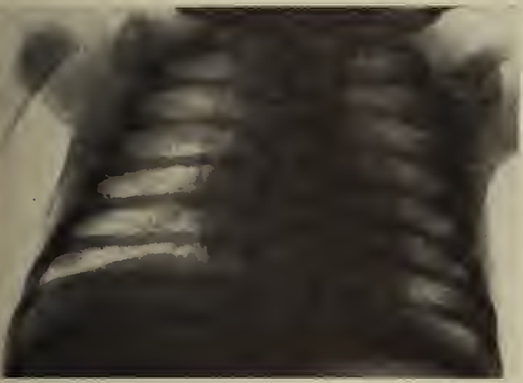

FIG. 1. CASE 4. BABY E. H., SHOWING EVIDENCE OF PNEUMONIA UPPER LEFT CHEST

Case 6: J. K., a white male, born July 30, 1930. Weight at birth was 8 pounds, 4½ ounces; on discharge from obstetrical hospital on August 12 it was 7 pounds, 15¾ ounces. Baths followed by witch hazel and ST37. Sneezing in hospital. Began to cough; breathed with grunt on August 15. Would not nurse. Entered Children's Hospital cyanosed with coarse râles over right lung posteriorly. Died on August 16, 1930. Necropsy revealed the left pleurae free from adhesions and no accumulation of fluid. There was no exudate upon the surface of the lung. The left lung was generally air-containing although somewhat congested posteriorly and at the base. The right chest showed considerable turbid yellowish fluid in the pleural cavity with a soft, yellow plastic exudate upon both visceral and parietal layers. The anterior and lateral surfaces of the lung were bright red; the posterior surface especially at the base was dark purple. The entire lung was very firm. On gross section the lung tissue was found to be bright red except for several dark purple and soft areas, the latter being well-developed abscesses. Anatomical diagnosis: (1) Lobar pneumonia (with abscesses); (2) pleurisy—fibrinopurulent; (3) lymphadenitis (bronchial glands).

Case 7: H., a white male, born on August 4, 1930. Birth weight was 9 pounds, 4 ounces; weight on discharge was 9 pounds, 3½ ounces (Drs. Frank Leech and R. R. Hottel). Temperature was 100.6°F. on the third day; slight cough, "lesions on body"; placed in isolation. Holts, Dryco, Protein Milk. Ung. Am. Hg. to lesions. Dulness over left lung with suppressed breathing, right lung bronchial breathing; cyanosed. Marked swelling both sides of neck. Autopsy revealed body of a well-developed and nourished male infant, weighing 6 pounds, 14 ounces. There was an indurated area over the right clavicle just above the shoulder. There was an opening in the skin in this area 1 cm. in diameter from which exuded a seropurulent exudate. Induration of the subcutaneous tissue of this area extended well into the occipital region. There was some induration over the opposite side of the neck and a branny desquamation over the left anterior cubital fossa. The left pleural cavity showed a number of fibrinous adhesions about the lower lobe and contained about 25 cc. of a fibrinopurulent yellow material. The right lung showed a number of dark hemorrhagic consolidated areas scattered over the lung tissue itself, areas varying in size from several mm. to 1½ cm. in diameter. Some of these areas were undergoing abscessed formation. The left lung was similar in appearance to that previously described. The lower lobe showed more massive consolidation with a few areas of crepitation. Anatomical diagnosis: (1) Cellulitis of the neck; (2) empyema, left; (3) hemorrhagic bronchopneumonia, right and left, with abscess formations; (4) acute congestion of the liver, kidneys and adrenals.

Case 8: S. W., a white male, born August 7, 1930 (Dr. W. A. Ryon). Weight at birth was 5 pounds, 8½ ounces; on discharge on August 16, 1930, 5 pounds, ¼ ounce. Date of admission to Children's Hospital, August 19; death occurred same day. The baby had had a cold since second day after birth. Had taken breast milk from spoon and left Sibley Hospital on August 16. Had only slight nasal discharge and seemed to have trouble breathing. Appeared much worse on morning of August 19; had taken almost no food that day. Child in extreme condition. Breathed now and then only. Very cyanosed. Respiration ceased at 5:50 P.M. Autopsy by coroner, bronchopneumonia with cardiac dilatation.

Case 9: M. H., a white male, born August 7, 1930, discharged from hospital on August 18. Died at home 6 days after leaving hospital with an acute pneumonic process. No autopsy. (Dr. E. W. Burch.)

Case 10: P. A. S., a white female, born August 6, 1930, following a normal pregnancy and delivery (Dr. W. A. Ryon, obstetrician). "The mother enjoyed perfect health during the entire course of pregnancy and gave no evidence of either local or systemic infection. Her labor was perfectly normal in conduct and duration. No instrumentation of any kind was required. The baby, at birth, showed no evidence of infection or abnormalities of any kind. It was admitted to the Fourth Floor Nursery, weighing 9 pounds, 9 ounces, with a rectal temperature of 99°F. On the second day the baby was noted to have a temperature of 102°F. by rectum, but no signs of any distress. During the 10 days of its hospitalization it continued to run a temperature varying from 102°F. to 99.8°F., being discharged from the hospital with a rectal temperature of 100°F. During this period the baby showed no evidence whatsoever of any complication, other than the abnormal fever. It nursed well, bowel movements were normal and it regained its birth weight by the time of discharge. On the second day at home the baby developed a rhinitis with an increasing mucopurulent discharge from the nose. This was followed on the thirteenth day of life by a macular and papular eruption, beginning about the nose and spreading over the face. By the fourteenth day a severe bronchitis had developed, food was refused, abdominal distention had become noticeable and the baby appeared toxic. A diagnosis of bronchopneumonia was made on the fifteenth day and the baby was hospitalized. The baby continued to grow worse rapidly and died shortly after being admitted to the hospital."* The body was that of a fairly well-nourished baby girl apparently 2 weeks old. No external markings of importance except several encrusted lesions on scalp were noted. There was rather a thin layer of subcutaneous fat, and the musculature was fairly well developed. On opening the chest there was found a large amount of cloudy fluid containing numerous flakes in the left pleural cavity and a plastic exudate attaching the visceral to the parietal pleura. This exudate covered practically the entire surface of the left lung. The entire left lung appeared to be consolidated, the lower lobe more firmly than the upper. There were a number of small yellowish, quite sharply defined nodules scattered over the tissue just below the visceral pleura. On section of the left lung numerous small abscesses were found and the tissue was quite firmly consolidated. Cut section was dark red in color. Anatomical diagnosis: (1) Serofibrinopurulent pleurisy; (2) pneumonia with abscess formation; (3) atelectasis, right lung; (4) congestion of liver and kidneys. Microscopic examination of tissue: lung section showed poorly staining fragments of lung tissue which were embedded in a mass of red blood cells and leukocytes corresponding to striking abscess formation noted in the gross description.

Case 11: R. G. B., a white male, born August 9, 1930 (Drs. Bernard Notes and Edward Lewis). Before leaving the obstetrical hospital the baby was sneezing, later developing a cough, then nasal discharge; cyanosed upon entrance to Children's Hospital on August 30. Temperature was 103°F. Tracheotomy was performed because of inspiratory dyspnea. Phleboclysis given. Breath sounds over chest very harsh. Pure culture from thick tenacious mucus in trachea, hemolytic staphylococcus albus and streptococcus. Necropsy protocol stated that the body was that of a well-nourished white male. There were no external markings of importance except puncture wound in the back, incision of the left arm, the site of an intravenous injection, and a tracheotomy wound in the neck. The left lung was reddened throughout. There were several darker hemorrhagic areas, also a number of atelectatic areas in both lungs. On section there was no evidence of definite consolidation in either lung, and the lower lobe in the left lung did not contain as much air as the other lobes. The larynx showed no abnormalities. Trachea showed an incised wound the result of a tracheotomy. The wound was in good condition and there was no edema of the soft tissues. For a short distance below the larynx the trachea was filled with thick tenacious exudate which did not seem to completely occlude the passage. Left bronchus contained a considerable amount of a thick tenacious purulent material. Its first branch contained a similar material and fairly well-organized yellow exudate. Anatomical diagnosis: capillary bronchitis.

SUMMARY WITH COMMENT

1. An epidemic in the nursery of an obstetrical department of a general hospital is reported, characterized by pustular skin lesions with fulminating respiratory infections.

2. Multiple abscesses in the lungs of fatal cases were found with the presence of Staphylococcus albus hemolyticus. An organism obtained from one of the cases was injected into an animal in which later were found quite typical lung lesions. (Chickering and Park report pneumonia due to Staphylococcus aureus in army camps during the late war; in 312 cases cultured 92 showed this organism alone. The clinical features and necropsies were very similar to those here reported.)

3. The presence of pustular skin lesions followed by respiratory involvement suggests that the mode of conveyance of the organism was through blood channels to lung and not droplet infection. The unusual conditions of weather, i.e., widely fluctuating temperature reaching as high as 106°F., aided materially in the spread of infection; the baby's maladjustment to temperature changes is well recognized.

4. Publicity through the reporting of nursery infections when they occur cannot fail to bring rewards in the building of barriers against further spread and repetitions.

5. Pediatricians should take an active part in recommending improvements in nursery technic. It has been well said that "the boiling of the infant's food with neglect of other necessary measures is quite similar to sterilizing instruments in the operating room with failure to

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* Dr. Ryon's summary of history given in detail.

introduce full asepsis." The Dick aseptic nursery technic should be widely known and employed. The results reported by Sauer are well worth perusal and note. It is quite impossible to put even an approximation of the Dick system in effect with large numbers entering and leaving the nursery even if they are all very good obstetricians.

6. No criticism is intended for the hospital which was unfortunate enough to encounter this serious outbreak. My remarks are most general in application, containing constructive suggestions for all hospitals with nurseries now appended to their obstetrical departments.

7. In the industrious use of nose drops one should be fully cognizant that there have been reported in the literature under various headings (see as a type paper, "Pneumonia Due to the Aspiration of Lipoids," by John W. Pierson) reasons for not so using oil. Argyria from use of argyrol or neosilvol in the nose is common knowledge.

8. It may be of importance to have nurseries adjacent to the obstetrical department under the care of a pediatrician; at least, eliminating the presence of the various obstetricians would numerically reduce the possible avenues of infection.

BIBLIOGRAPHY

Chickering, H. T., and Park, J. H.: Staphylococcus aureus Pneumonia. J. A. M. A., 1919, **72**, 617.

Cruikshank, J. N.: Child Life Investigations: The Causes of Neo-natal Death. London, His Majesty's Stat. Off., 1930.

DeLee, J. B., and Siedentopf, H.: Maternity Ward of General Hospital. J. A. M. A., 1933, **100**, 6.

Pierson, J. W.: Pneumonia Due to Aspiration of Lipoids. J. A. M. A., 1932, 99, 1,163.

Sauer, L. W.: Enteritis in Infants: Prevention of its Spread; Dick Diet Kitchen and Aseptic Nursery Technic. J. Pediat., 1935, **6**, 753.

Warwick, M.: Pneumonia in New-born and Stillborn Infants. Am. J. M. Sc., 1934, **187**, 253.

WILLIAM CLINE BORDEN*

1858-1934

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The presentation of the historical record of a father by his son has awakened the memory of events long forgotten that in their time were filled with importance and ofttimes influenced by human interest and emotion. The preparation of these data has led to many details unknown to me, and for the first time brought to light. Because of the intimate association, I crave your understanding for injecting the personal element throughout this review. By the very nature of events this becomes necessary.

A meticulous and orderly mind has left behind records that date from childhood. As we turn back the pages we find his first childish drawings carefully saved by his mother, and the Sunday School merit cards made out to little "Willie." Among these drawings, a sailboat, sketched in pencil, was the early forerunner of a future reality.

The only son of a farmer preacher whose early days were spent on a farm in northern New York State where because of enforced solitude he had to turn to reading for recreation, William Cline Borden, known in his community as "Will," developed into manhood. His first step toward self-support was in the field of teaching. From academic teaching he turned to the field of medicine, and in keeping with the custom of his day entered the office of a Dr. H. W. Jewitt of Chaumont, New York. In this capacity he worked for 4 years, receiving his first insight into the clinical side of medicine. This practical application settled his mind as to his future career.

Entering Columbian College, now George Washington University, he found among his classmates the late Daniel K. Shute, later to become Professor of Anatomy, Charles W. Richardson, our late Professor of Otolaryngology, and Dr. Harry C. Corbett, who is still practicing medicine across the Potomac in Arlington, Virginia. Twenty-nine years later, in this school, I was to meet for the first time Munson Corbett (now Major, United States Army Medical Corps), the son of my father's classmate to renew with him the association of our fathers.

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* Read before the George Washington University Medical Society, May 16, 1936. This address appears in two instalments, of which this is the first.

During the summer vacation of his second year Student Borden met John Wesley Bovée, a farm-hand, who had hired himself out for the entire summer on my grandfather's farm for the sum of $100.00. This chance acquaintance led Bovée to George Washington University where he ultimately occupied the chair of gynecology. It is interesting to note that these two young men met their financial obligations by working in White's drug store located on the outskirts of Washington, now known as Dupont Circle. My father as manager employed young Bovée as clerk. Thus began a friendship that was to last throughout their lives.

Upon receiving his medical diploma in 1883 Dr. Borden determined to get married. Having no immediate means of support he passed the examinations of the Army Medical Board in New York City and was appointed an Acting Assistant Surgeon, United States Army. All of his early orders from the Surgeon's Office are carefully filed away and it is of interest to note that they were issued in longhand writing in keeping with the time when the typewriter was not in common use.

No better account of his early history and army experience is obtainable than that contained in a letter from which I quote.

Fort Adams, Newport, R. I.
January 24, 1893

"My first contact with the army was made at the headquarters of the Department of The Platte, Omaha, Nebraska, in the latter part of December, 1883, when I reported there for orders with the status of Acting Assistant Surgeon, having passed the Army Medical Board some months before, and having accepted a contract until such time as my commission as First Lieutenant and Assistant Surgeon should be made out, delivered, and accepted. Having made my official bow to the Department Commander, General O. O. Howard and Lieutenant Colonel J. O. Summers, the Medical Director, I waited patiently several days while these authorities decided where I could first and best serve the Government.

During my period of waiting, I wandered about the city and saw as much of it as the cold of that season of the year and the high cutting winds, which blow there with a violence approaching hurricanes, would permit.

Omaha looked very new then but very promising for the future, which promise it has more than fulfilled. Having waited a due time, I finally received an order to proceed to Fort Laramie, Wyoming, which order I proceeded to obey, and on reaching Cheyenne was there introduced to my first stage-coach, by which I was to complete my journey to Fort Laramie, some 90 miles north of the railroad. The temperature was several degrees below zero, but the coach was full and fortunately among the passengers was a commercial traveler, who with the true spirit of his kind, kept up a series of yarns which made the time pass with a zest it would otherwise have lacked.

As a means for furthering acquaintance, a stage-coach surpasses any other mode of conveyance with which I am acquainted.

We occupants of that stage were as well known to each other at the end of the 36 hours of that journey, including general information regarding tastes, habits and family as we would ordinarily have been had we lived in the same neighborhood for years.

When the stage stopped for the night at a place called the Chugwater, I remember that one of my fellow travelers and myself were assigned to the same room in the small house which served for a hotel, and that on retiring he drew from his hip pocket a large and formidable looking, but hitherto undisplayed revolver, and placed it on a chair by the side of his bed. This brought remembrances of readings from Bret Harte to my mind, but I must say that during my stay of about 8 years in the West, while I saw the revolver prettly frequently worn for ornamental purposes, I never knew it to be used otherwise, and my only experience of bloodshed from one was when called professionally to see a cowboy, who had accidentally shot himself in the leg with his own ornament.

When the stage finally reached Laramie and I walked to the Post from the stage office, I virtually made my first entry into a military post, as aside from a drive to Fort Omaha when stopping in Omaha, I had never been inside a military post. To me everything was new—the military manner, the military life, and the military method.

I was not left at Laramie long enough to more than see that military and civil life have some marked differences, and to experience the winds which blew so there that the lower panes of glass in the windows of the quarters were scratched as if by diamonds through its constant hurling of fine sand and gravel against them, for in about 2 weeks I received an order to proceed to Fort Bridger, Wyoming.

Back I travelled to Cheyenne, the thermometer still below zero, and from there on westward by rail to the western part of Wyoming down in a little river bottom, 10 miles from the Union Pacific Railroad was the now abandoned post of Fort Bridger.

This was a typical old frontier Post minus the Indians. Many of the quarters were of log, their thick walls making them comfortable in winter when the temperature dropped to 30 or 40 degrees below zero as it frequently did. The elevation of the Post above sea level was nearly 5,000 feet. On three sides sage brush plains extended to the horizon, while on the south some 30 miles distant the Wasatch Mountains with their summits always covered with snow were in view.

The hunting and trout fishing near the Post were superb, and added much toward making the place attractive during the 16 months I spent there. On February 15, 1884, I received and accepted my commission as First Lieutenant and Assistant Surgeon; the commission dating from the third of December of the preceding year, and in May, 1885, my station was changed to Fort Douglas, Salt Lake City, Utah.

The change from the barren plains of Wyoming to the fertile valley of the Great Salt Lake was striking and one of my most pleasant recollections is that of the sudden passing from the winter of the elevated table lands of Wyoming, into the spring of the Salt Lake Valley.

From Ogden to Salt Lake City the railroad passed through a continuous succession of peach orchards in full blossom, and the air was redolent with their perfume. I remained at Fort Douglas 3 years, and I look back upon this as the pleasantest station I have had since entering the army.

The Post is pleasant, the climate the finest I have ever lived in, and the scenery magnificent. From the Post situated on the western slope of the Wasatch Mountains, the valley of the Great Salt Lake with its farms and city is spread like a panorama below, bounded on the west by Goshout Mountains rising into snow peaks with the Great Salt Lake at their base; and on the east rising directly behind the fort and extending south is the Wasatch range crowned with eternal snow. While in Utah I made several trips to different parts of the territory and saw much of interest both in scenery and the peculiar institutions of the Mormon Church.

The latter is well worthy of study by the social economist, and when the subject can be approached without prejudice and in the true spirit of scientific investigation, the laws and workings of the Mormon community will furnish a most interesting example of peculiar religious government. In April, 1888, I was ordered from Douglas to San Antonio, Texas, but only remained there until October of the same year when I was moved to Fort Ringgold, Texas. Ringgold is probably as undesirable a Post to be stationed at as any now garrisoned. It is on the Mexican border some 70 miles from the railroad, the ride to it being made by relays without stop, over a sandy, cactus covered and almost uninhabited country. The winters during which season I was there are delightful, nearly approaching a northern June, varied by occasional colder or warmer temperature.

Our Christmas dinner was eaten with windows open, the ladies in muslin dresses, and the thermometer registering 82 degrees maximum. The summers are extremely hot and I was fortunate in being ordered away early in the spring. On December 3, 1888, I received my promotion to a Captaincy and in May, 1889, I was ordered back to San Antonio. I remained at San Antonio, excepting for a leave of 4 months which I spent in the north, until October, 1890, when the incoming of a new Surgeon General with scores to pay, moved over 30 medical officers by one order, myself among them, my order being for Fort Davis, Texas. My stay at San Antonio was pleasant, as the garrison was large and attractive, the headquarters of the department being there in addition to the Post of Fort Sam Houston.

The City of San Antonio offered many attractions, and the old missions in and near the city of which the famous 'Alamo,' 'The Cradle of Texas Liberty,' is one of great interest. They were erected early in 1700 by Jesuit missionaries and are now picturesque ruins. As such they gave me many subjects for my camera, I having taken up amateur photography when in Utah in 1885.

I left San Antonio with regret as Fort Davis, westward nearly to the border of Texas, promised to be a dreary station.

It is, or rather was, as it is now abandoned, situated on the uplands of the Rockies some 20 miles from the Southern Pacific Railroad. The country about it is typically mountain in character, being long levels, rising into mountain ridges or breaking down into picturesque canyons. The Post itself was at the base of a mountain ridge which rises like a bulwark several hundred feet sheer above it. I found Davis more agreeable than I had anticipated as we had a pleasant garrison and I was kept busy with outside practice among the ranchmen in the vicinity. I remained there but 8 months, as in June, 1871, the Post was abandoned, the troops going to other Posts and I to Jackson Barracks, New Orleans, Louisiana. My stay at New Orleans was one of mingled discomfort and pleasure. The winters there are delightful on account of mild climate, pleasant society, excellent theaters, and many distinctive features of the city by which it varies from others of the United States. The French element is large and has given its society a distinctive form, and the French opera which presents grand opera during the winter season is a great attraction for all lovers of music.

The discomforts of my stay there were entirely due to the very hot and debilitating summers. During most of the summer of 1892 I was away on temporary duty at Mount Vernon Barracks, some 20 miles north of Mobile, Alabama. It is there that Geronimo and his band of Apaches of Arizona fame are held as prisoners of war, or rather the older men and the women are now so held, the younger men having been enlisted in the army, forming company 'I' of the Twelfth Infantry.

I became much interested in studying the racial characteristics of these Indians. They are a race in which bravery and craftiness, frankness and duplicity, submission to known power and lawlessness are curiously blended.

They make excellent soldiers, the company formed from them being an example of neatness and discipline. In September I returned to Jackson Barracks but only remained there until December of the same year, 1892, when I was ordered to Fort Adams, Newport, Rhode Island, where I am now stationed.

Such is the history of my career since entering the Army. I find that in all, since entering the service, including changes of station, I have performed 26 journeys by rail under orders, an average of 3 each year, besides 4 journeys going and returning from leaves of absence. These trips have varied from a few to many hundred miles in length and have carried me over a considerable part of the country east of the Rocky Mountains. The record of a 'rolling stone' surely!

While in garrison my time has been mainly taken up with the daily routine of medical work, and with work with the microscope and photography. My life so far has been very uneventful and personally has been marked only by my marriage and birth of my two sons, one of whom was born at Fort Douglas and the other at San Antonio."

Lieutenant Borden's first contribution to medical science was written at Fort Douglas, Utah, in 1887 (the date of my birth), entitled "An Extemporized Section Flattener" which had to do with the original technic of the cutting of paraffin sections. Shortly after publishing this paper Lieutenant Borden was called to his home in northern New York because of the final illness of his father. Apparently he inadvertently overstayed his leave of absence by one day and was asked officially for an explanation. I quote his characteristic answer.

Fort Douglas, Utah
August 1, 1887

To the Post Adjutant,
Fort Douglas, Utah.

Sir:

In reply to your communication of July 30, I have the honor to submit the following explanation for my absence beyond the limit of leave granted me by S. O. B. # 138, dated Hdqrs' of the Army, A. G. O., Washington, D. C., June 16, 1887. My absence was due to an unintentional and uncorrected misconception of the date upon which I should report at my station. This misconception arose in the following manner:

My leave was asked for on account of the illness of my father. On the afternoon of June 27, at about 5 o'clock I received a telegram saying that he was worse and the next morning at 8 o'clock left the Post. Having made no previous preparations for departure, owing to the fact that I had not expected so sudden a summons, I was greatly hurried and made no inquiries as to the date upon which I should return. I then thought that leaving on the 28th it would be necessary for me to report at my post on the 29th of the following month. This mistaken idea arose from my knowing that an officer having one day's leave and leaving on say the 3rd would return on the 4th. Extending this thought to a month I made my mistake. My anxiety regarding my father, my close attendance upon him, until his death on the 19th and the many business matters which demanded my attention so occupied my mind that I gave no further thought to the exact date of my return until just before taking the train on the morning of the 25th to return when I received a telegram from Lieutenant Z. A. Torrey, Post Adjutant, saying that my leave would expire on the 27th. I then upon thinking the matter up saw my mistake but too late to correct it and consequently reported at this post on July 29, instead of July 28.

Very respectfully,
your obedient servant,
(Signed) W. C. Borden,
1st Lieut. and Ass't. Surgeon

In 1889 "The Origin and Development of the Fat Cell of the Frog," an original work, was submitted for publication in The Microscope, and later "The Fat Cell, Its Origin, Development and Histological Position in the Human" was published in the New York Medical Journal. In 1892, the then Captain Borden was ordered to Mount Vernon Barracks, Alabama, to investigate and improve the health status of the Apache Indian community. Culminating this effort the first vital statistics of an Indian reservation was published. These statistics concerned nearly pure-blooded Indians living in a restricted environment. For generations the Apaches had lived in Arizona becoming constitutionally adapted to dry rarefied air and clear diathermic atmosphere of the elevated regions of the Southwest. In 1886 after numerous outbreaks they were captured by United States troops and removed to Mount Vernon Barracks. The resulting change produced a high death rate as disclosed in the report submitted to the Surgeon General by Captain Borden which reads as follows:

THE VITAL STATISTICS OF AN APACHE INDIAN COMMUNITY

By W. C. Borden, M.D., *Captain, Medical Department, United States Army*

These statistics, which are for a period of 5 years, from July 1, 1887, to June 20, 1892, were compiled by the writer from the official records of the military post at Mount Vernon Barracks, Alabama, while on duty there during the summer of 1892, and are those of the Apache Indians now kept there under military supervision and control. This Indian community numbers about 400 (men, women and children), and is composed of various Apache bands, among them being the noted Geronimo and his followers, of Arizona fame.

Captivity, unaccustomed restraint and enforced idleness operated to prevent the mental stimulus of personal endeavor and combined with their unsanitary surroundings to produce a condition of mental and physical demoralization. As a result, the death-rate gradually increased until for the year ending June 30, 1891, it reached the extremely high rate of 142 per 1,000 of living.

During the last period of 1 year, beginning July 1, 1891, the condition of the community was improved in all ways.

Their new village being on the crest of a hill has plenty of sunlight and free circulation of air. The houses are of fairly good construction, are well lighted by good-sized windows, are plainly built, and are easily kept clean.

The enlistment of many of the men, and the employment of most of the others at paid labor about the village and garrison, removed the demoralizing effect of enforced idleness and gave the Indians a mental stimulus the effects of which can hardly be overrated.

EXTRACT FROM THE REPORT OF THE SURGEON GENERAL OF THE ARMY

For the fiscal year ending June 30, 1892

INDIAN PRISONERS

The death rate among these has been exceedingly high since their establishment at Mount Vernon Barracks, Alabama. Consumption among the older members of the community and diarrheal affections among the children have been the principal causes, aided in most instances by the gross ignorance of the people and in several cases by their efforts at cure. The following extracts from reports of medical officers on duty at this station throw light upon the conditions. Captain Borden appears to have effected a material improvement, supported as he has been by Lieutenant Wotherspoon, Twelfth Infantry, in charge of the prisoners. The report of the latter shows how much has been accomplished since the almost naked, filthy, and vermin-covered colony became settled in their present location.

Because of his article on "Practical Photomicrography by Use of the Oil Lamp" he was elected to the Royal Microscopical Society of London. It will be seen that his early career was devoted in its research work to the microscope and bacteriology. Among his communications at this early period are many letters from the then Surgeon General Sternberg who did so much pioneer work in bacteriology.

Colonel Ashburn in his history of the United States Medical Corps relates an interesting incident relative to Captain Borden. "Before his entry into the service, Borden was interested in histology and when sent to a Texas post he made a special requisition for and obtained a fine microscope, a photomicrographic apparatus and other things not on the supply table. Colonel Baxter, then Chief of Supplies, disapproved of these requirements, but had to purchase them. As soon as he became Surgeon General he issued an order changing the stations of 32 medical officers who had incurred his dislike, among them Borden. Shortly after this, Borden was in Washington and he called at the Surgeon General's Office, but Baxter was away. Major Greenleaf, a delightful kind and very able man, but an administrator and not a microscopist; undertook to set the young man on the right path, telling him to quit fooling with the microscope and to do things for the Corps. Borden replied that he did all of his duties and still had much spare time and that he could not see why exception should be taken to his choice of the microscope in place of cards, drinking, hunting or the club. Greenleaf said that there was no objection but that it got one nowhere. 'Look at Sternberg, over there in New York spending all his time with a microscope. Can you tell me one earthly bit of good Sternberg is to the Medical Corps?' Sternberg's later appointment to the Surgeon Generalcy over himself was probably never understood by Greenleaf and many others."

The Spanish-American War in 1898 ultimately brought Major Borden to Washington. Just before the Maine was sunk in Havana Harbor, Captain Borden was experimenting for the first time with a static X-ray machine recently obtained at the post hospital at Fort Snelling, Minn. This early experience with the X-ray was of inestimable value during his days of war service. With the third infantry Major Borden went first to Tampa, Florida, and later was stationed at Key West, Florida. At the conclusion of hostilities he was placed in charge of the steamship "Shennock" transporting the sick and wounded from Montauk Point to New York City. Illustrative of post-war hysteria it is interesting to quote the following from the New York Journal:

New York Journal, Friday, September 2, 1898

HORROR SHIP FROM MONTAUK, HEROES SUFFER

Hustling Sick Men from Montauk

More than 300 sick soldiers—the largest single batch to arrive here since the war ended—were literally dumped into New York yesterday. The story of their shipment to this city is a fresh chapter in the history of gross neglect and criminal carelessness that have characterized the treatment of the sick and wounded heroes of the Santiago campaign.

The men were brought to this city from Montauk Point by the steamer Shinnecock, of the Montauk Steamboat Company. They were hurried without ceremony from the hospitals at Camp Wikoff and put aboard the steamer on Wednesday evening. No reason was given for their removal except that the men would fare better at city hospitals; no excuse whatever was made for the haste with which the move was made. It is a significant fact that President McKinley will be at Camp Wikoff tomorrow, and it is asserted that the sick men were hustled from the hospitals in order that the camp might present a better appearance during the visit of the Commander-in-Chief.

Many Seriously Ill

Of those who were brought to this city on the Shinnecock yesterday the majority were precariously ill; many were near the point of death, and there were few who could leave the steamer without assistance. The men were emaciated and weak from fever and from actual hunger on board the ship.

Brigade Surgeon Major W. C. Borden, who was in command of the ship, had purchased $1,000 worth of delicacies for the soldiers. With these packed in boxes on board, and within reach, the men could not be fed, because the haste of their removal had been so great that lists and diagnoses of the patients could not be furnished. There was not a list of the men on board. They were packed into the ship and hustled away without knowing who they were, to what command they belonged or of what they were ill.

The only list that could be had was made by asking each soldier his name and company as he was removed from the ship. Often the voice from the litter was weak and faint and the steward guessed at the patient's name rather than prolong the agony of making the man speak. No one died on board. If he had, his identity would probably never have been known.

One private became insane during the trip. He was violent and the nurses confined him in a strait-jacket. He was taken to St. Peter's Hospital. The unfortunate's name could not be learned. Some said that he was a member of the Eighth Ohio—"The President's Own"—others that he belonged to a Massachusetts regiment.

Same Food For All

Men who were convalescing were set back because the only food that could be allowed consisted of soups and bread. The bread was stale. It was admitted to be so by a steward of the hospital corps who served it. Men who were wounded and had no other ailment were forced to subsist on the scant food of a patient dangerously ill of typhoid fever, because there was no way of telling what all the men were suffering from.

Even the exact number of the patients brought by the Shinnecock is a matter of hazard. At Camp Wikoff it was said that 271 were put on board. An officer of the vessel, who counted the men, says that there were 308. Surgeon Major D. M. Appel's list of the men sent to the various hospitals presents a total of 317.

The Shinnecock arrived at Pier 40, East River, at 3 o'clock yesterday morning. It was 5 o'clock in the afternoon before the last patient was put ashore.

Ten Men Starve All Day

There were on board, under charge of Surgeon Major Borden and his assistants, Surgeons Jackson, Claytor and Ussher, 24 hospital nurses, 5 of whom were women and 7 stewards.

Major Borden said in connection with rumors that the men had been hurried away from Montauk in order to have the camp cleaned up before the arrival of President McKinley:

"There is no truth in that rumor. It was thought best to remove the men who could be moved to permanent hospitals in this city, so as to make more room for others who are arriving at Camp Wikoff. It is also untrue that the men we brought on this our first trip are nearly dead. There are about 20 men out of the 271 who, although well enough to be moved, may die after being in the hospital for a while. All the others ought to recover after being in the hospital for 3 or 4 weeks."

Both Major Borden and Major Appel were pleased with the way in which the men were transferred to the hospitals. They commended the idea of bringing the men to the city in a boat instead of on cars, not only because there was less dust and more fresh air on the water, but also because the boat was able to make a landing near each hospital and thereby lessen the ride in ambulances.

Major Borden said that on the next trip he would station men at the gangways to prevent sick men from regaling themselves with pies and other delicacies.

"While my back was turned," said he, "one convalescent slipped out on to the pier and brought in a piece of lemon pie and divided it with a man whose stomach would not have stood a glass of milk. Nearly all the complaints of sick men being starved are from men who are so indiscrete as to want to eat lemon pie or other things equally indigestible to a sick man."

After the war with Spain, Major Borden was assigned to the Army General Hospital at Washington Barracks. His family was quartered in the large brick dwelling that had formerly housed Mrs. Surat prior to her trial and execution for her activities with the so-called Booth conspiracy, which resulted in the assassination of Abraham Lincoln. By order of a joint resolution of Congress, Major Borden published in 1899 the first text-book ever to appear in this country on the "Use of the Roentgen Ray." This book printed as an official document by the Government Printing Office outlined the use of the roentgen ray by the Medical Department of the United States Army in the war with Spain. The present-day status of the modern X-ray technic can be appreciated by quoting a few passages from this first book. "To operate a 10-plate X-ray machine a motor of one fourth horsepower is required. Unfortunately electric current cannot always be obtained in military hospitals where manual power must be used. Such labor is extremely tiring so a tandem bicycle attachment for running the machine is very useful."

The time and distance of exposure in taking X-ray pictures is described as follows:

"A tube placed 10 inches from the body and using a rapid X-ray plate should be allowed 20 minutes exposure for a hip joint, head or pelvis."

The X-ray burn was indefinitely understood at that time and the destructive feature of the X-ray was yet to be demonstrated by actual experience over a long period of time. Precaution against X-ray burns is noted in the following sentence.

"To prevent burning, exposures should not exceed 30 minutes, for with this length of exposure any part of the body may be radiographed provided the apparatus is working properly and a good technic is used."

By these few excerpts one can compare our modern X-ray with the primitive machine of 1898. My own memory goes back to the time when my father, in need of a subject, would place my head under a tube for prolonged exposure while some poor corps man would labor away at the static machine. My patience would be rewarded by being allowed to look through the fluoroscope and see a nickel in a box.

Some years later Major Borden X-rayed the knee of former President Theodore Roosevelt. For political reasons this was never made public, but I well remember the event.

As attested to by the Secretary of the Association of Military Surgeons, Major Borden in 1902 originated the idea of incorporating by Act of Congress the Association, with the Secretaries of War, Navy, Treasury and the Surgeon Generals of the different public services forming an Advisory Board, so making it a national body. As one of the original incorporators he received the following communication: "The debt which the Association owes to you for suggesting the matter and carrying it through is one which can never be repaid."

One year later (1903) Major Borden at the request of the Surgeon General wrote the original draft of the new Reorganization Bill of the Medical Department which became law in 1907. To this bill as submitted by the Surgeon General he became the author and advocate of the new provisions which included the recommissioning of the officers of the Medical Department, the single examination for the promotion with a Board of Review, and the entire Medical Reserve Corps section by which the Contract Surgeon system was abolished and the Reserve Corps organized. These new proposed provisions led to a controversy between Major Borden and Major Azel Ames, a former Surgeon in the United States Volunteers. The Journal of Military Surgeons in 1905 published the opposing views of these two officers. The uncompromising position taken by each man with his respective reasoning has been answered with the passage of time. Events prognosticated 33 years ago by the author of the Reserve Corps Bill have withstood the practical application of a world war.

(To be continued)

The Pathogenesis of Circulatory Failure.—. . . Failure of the circulation is of two general types which may coexist but usually occur separately. The forward type of circulatory failure usually involves primarily the peripheral vascular apparatus but is occasionally due to disorders of the heart. The clinical picture is that of collapse and is brought about by inadequacy of the tissue blood supply. The backward type of circulatory failure is dependent on chronic disease of the heart, which leads to a rise in venous pressure, either in the pulmonary or systemic vascular bed, or in both of these areas, and produces the clinical picture of congestive heart failure. It is of interest to recall that the greatest of all students of the cardiovascular system, William Harvey, 300 years ago arrived at the same conclusions which have been established by modern research. Harvey wrote: "If a live snake be cut open, the heart may be seen quietly and distinctly beating for more than an hour, moving like a worm and propelling blood when it contracts longitudinally, for it is oblong. It becomes pale in systole, the reverse in diastole, and almost all the other things we have mentioned as proving the truth may be clearly observed, for here all happens slower and more distinctly. This especially may be seen more clearly than the midday sun. The vena cava enters at the lower part of the heart, the artery leaves at the upper. Now, pinching off the vena cava with a forceps or between finger and thumb, the course of blood being intercepted some distance below the heart, you will see that the space between the finger and the heart is drained at once, the blood being emptied by the heart beat. At the same time the heart becomes much paler even in distention from lack of blood, and beats more slowly, so that it seems to be dying. Immediately on releasing the vein, the color and size of the heart return to normal. On the other hand, leaving the vein alone, if you ligate or compress the artery a little distance above the heart, you will see the space between the compression and the heart, and the latter also, became greatly distended and very turgid, of a purple or livid color, and, choked by the blood, it will seem to suffocate. On removing the block, the normal color, size and pulse return. This is evidence of two kinds of death, failure from a lack, and suffocation from excess. In these examples of both, one may find proof before his eyes of the truth spoken about the heart."

Extract from article by TINSLEY R. HARRISON, M.D., Nashville, Tennessee, *The New England Journal of Medicine*, September 10, 1936, p. 479.

The Fundamentals of Internal Medicine*

DISEASES OF THE NERVOUS SYSTEM

(*Continued from July, 1936*)

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IDIOPATHIC EPILEPSY

Etiology. The limitations of this term, which is so commonly used, must be clearly understood before it is applied to any one condition. The term itself is really an admission of ignorance and merely means that we are faced with a number of clinical manifestations the etiological factors of which are still obscure. Idiopathic epilepsy may best be defined as a condition characterized by loss of consciousness, by amnesia for the event and usually by convulsive seizures. A great number of well-recognized conditions, such as brain tumor, neurosyphilis, trauma or cerebral vascular accident may give rise to symptoms that are identical with those of true idiopathic epilepsy. Such cases belong to the group of symptomatic epilepsy and have been considered under their proper etiological headings. With investigation of the causes of epilepsy the group of symptomatic cases is gradually recognized to be becoming larger while that of idiopathic epilepsy is becoming smaller. It is to be hoped that in the near future the term idiopathic epilepsy may well be discarded and its symptoms recognized as the manifestation of a recognized lesion. Unfortunately at this time we continue to see a great many cases presenting the epileptic syndrome without any demonstrable etiology.

Physiological and Pathological Considerations. As regards morbid anatomy, a number of changes have been reported, but none is truly specific. The cerebrospinal fluid rarely shows changes either in pressure or in content.

There have been many theories concerning the production of the epileptic convulsion and a number also dealing with the possibility of a central zone governing such phenomena. Most of these theories fall into one of two groups: The first is that of irritation, which presupposes the stimulation of some epileptogenous zone within the cerebrum; the other is that of release, which presupposes the temporary paralysis or loss of function of an upper cerebral zone that normally controls a lower area which when released from its inhibition causes the production of convulsions. There is some evidence that tends to show that changes in the cerebral circulation may cause or accompany the epileptic syndrome.

Symptoms and Signs. The epileptic symptoms are usually divided into three groups: Those characterizing the grand mal, or major attack, the petit mal, or minor attack, and the epileptic equivalent. In all of them there is loss of consciousness and amnesia for the episode, and in the grand mal attack there is as well a convulsive seizure. The three types of attack may co-exist, may alternate, or may exist singly. The grand mal attack generally occurs quite suddenly but in a certain number of cases may be preceded by certain warnings or aurae. The latter are generally vague and subjective, such as headache, a feeling of nervousness or generalized distress; they may be more definite, such as tingling or numbness in particular limbs, or visual disturbances of various kinds; localized twitchings occasionally precede the attack; sudden pallor or flushing is also fairly common.

Whether preceded by an aura or not, the actual attack always occurs very suddenly, the patient falling as if felled by a blow and frequently bruising, sometimes severely injuring himself. In a typical attack the body first becomes hypertonic and rigid, the jaws being tightly clamped, so that occasionally the tongue is bitten; the pupils become dilated and fixed and the face congested. This phase rarely lasts for more than 15 or 20 seconds and is followed by the next phase, namely, that of clonus. In this phase the muscles of the body relax and contract rapidly, there are jerking movements of the extremities and of the head, saliva drools from the mouth, and the sphincters of bladder and bowel frequently relax. During this stage in general the superficial reflexes are lost, the deep reflexes are diminished, and abnormal reflexes such as the Babinski sign may appear. It is unusual for this phase to last more than 4 or 5 minutes, the general average being from 1 to 2 minutes. Following the clonic phase the patient usually becomes exhausted and falls into stupor; at other times episodes of postepileptic automatism may develop during which time the patient performs automatic acts, some of them destructive, of which he is entirely amnesic afterwards. Following a period of stupor the patient generally regains consciousness only to complain of severe headache that may persist for hours or for days.

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* This is the eleventh and last instalment of a treatise on Diseases of the Nervous System designed to acquaint the older graduate with the changing concepts of diseases of the nervous system and to review the subject for younger graduates.

Petit mal attacks generally last only a few seconds and the patient does not fall. He does, however, lose consciousness and has no recollection whatsoever of the episode. He may be talking, walking, or eating, when he suddenly stops, the face usually assumes a blank expression and he appears to be totally out of contact with his surroundings. Following the attack, which is usually very brief, he resumes where he left off with no consciousness of anything having occurred. Occasionally, even in these brief attacks, sphincter control is lost. Epileptic equivalents are characterized by the performance of purposeful acts, some of which may be quite violent, of which the patient is unconscious. The acts appear to be purposeful but are certainly automatic and are not related to circumstances or to environment.

The great majority of idiopathic epileptic conditions make their appearance during childhood or before the age of puberty. Attacks appearing after the age of 25 should be looked upon with suspicion and more than usually intensive search should be made for possible organic causes. In only a very small percentage of cases is there any definite or even suggestive history of familial or hereditary trends. Very often, however, one does obtain a history of petit mal attacks that have persisted for some time, to be followed by true grand mal seizures. In a very occasional case one obtains the history of typical epileptic attacks followed after a period of time by very long remissions amounting practically to spontaneous cure. The seizures themselves, whether of grand or petit mal type, have a distinct tendency toward periodicity. The periodicity is quite variable, some patients having several attacks a day, others having only one or two in the course of a year. Occasionally the attacks follow each other with such rapidity that the patient is in a practically continuous convulsive state. This condition is known as status epilepticus.

Many patients suffering from true idiopathic epilepsy appear to be quite normal both physically and mentally in the periods between attacks. As might be expected this is especially true of those patients with comparatively few attacks over a period of time. On the other hand, many patients, especially those with frequent attacks, show a combination of physical and mental deterioration that is almost characteristic of the epileptic condition. The mental change is especially notable and consists in "dulling," listlessness, loss of ability to concentrate and general emotional "flattening." At the same time these patients may become quite irritable, impulsive, and often commit definite antisocial acts. Epilepsy in young children is especially apt to be accompanied by very marked mental deterioration, feeblemindedness, imbecility and the like.

Course and Prognosis. The course of idiopathic epilepsy is extremely variable. Death in the course of an ordinary epileptic attack is very rare and is usually due to secondary complications such as injuries sustained during the attack. Notwithstanding the appearance of the patient, especially during the tonic phase, death by asphyxia is quite rare. On the other hand, status epilepticus if not treated promptly and vigorously very often does result in death. As has been previously stated the outlook as regards spontaneous cure is very poor; in general, the duration of life itself is not affected noticeably.

Diagnosis. The diagnosis of epilepsy is generally not too difficult. The history of periodic attacks of loss of consciousness often accompanied by convulsions with amnesia and especially with evidence of loss of sphincter control or of injury during the attacks is usually quite conclusive. Occasionally it may be necessary to witness an attack before a definite diagnosis can be arrived at. Petit mal attacks and epileptic equivalents are much more difficult to recognize and may persist for many years without being detected. Often it is only the occurrence of grand mal attacks that lead one to suspect preceding minor attacks. When once epileptic symptoms have been discovered it is absolutely essential that an extremely thorough search for possible etiological factors be made before the condition may be classified as an idiopathic one. Complete physical, metabolic and serological examinations should be carried out. Neurological examination should be especially painstaking, since the presence of even one single objective sign may indicate a physical origin that may be successfully treated or removed. Lumbar puncture should always be done with careful estimation of the cerebrospinal fluid pressure as well as of the complete chemistry and serology of the fluid. Only after such a complete study and after a period of observation extending over a reasonable length of time should one make a diagnosis of idiopathic epilepsy. Even so, reëxamination should be conducted at regular intervals as a hidden physical cause may make itself evident only after a comparatively long period.

Treatment. The treatment of symptomatic epilepsy and of idiopathic epilepsy is quite different. In the symptomatic group the etiologic agent, whatever it may be, must be attacked and extirpated. In the idiopathic group the treatment is still largely symptomatic and empirical. Various treatments have been suggested, of which drug therapy, the ketogenic diet and dehydration are the most important. Treatment should always be highly individualized, since one form that may succeed well in a certain case may fail miserably in another. Drug treatment still has the widest application, and of the drugs used the bromides and the barbiturates are of the most value. Bromides may be given to the limits of tolerance, that is to say, until signs of bromidism appear; in general, it is rarely necessary to administer more than 10 to 15 grains (0.65 to 1.0 Gm.) 3 times a day. Medication should be so controlled that the smallest possible dose necessary to control convulsions may be given. Within recent years phenobarbital, which is widely marketed under the trade name of Luminal, has replaced bromide to a great extent in the treatment of idiopathic epilepsy. It is much better tolerated than the bromide, has a much wider margin of safety and appears to be somewhat more effective in the control of the seizures. The usual dosage is from $\frac{1}{2}$ to $1\frac{1}{2}$ grains (0.03 to 0.9 Gm.) 3 times a day. Should the patient complain of lethargy or of sleepiness under this treatment caffeine may be added. The ketogenic diet in the treatment of epilepsy is based upon the observation that a certain degree of acidosis appears to have a tendency to diminish the incidence of convulsions. The treatment itself is rather disagreeable, the diet is difficult to balance properly and requires a special study in each case; the results have not been extremely encouraging. Treatment by dehydration, that is, by marked restriction of the fluid intake, has also been advocated and in a few cases appears to have been of some benefit.

The preceding remarks on treatment have been directed toward the chronic epileptic states and not toward the acute attack; in the latter case treatment is seldom necessary on account of the short duration of the attack and because of the rarity of opportunity to observe these actual convulsions. The only treatment indicated at the time should be directed toward preventing injury to the patient. The clothing should be loosened and a gag should be forced between the teeth to prevent biting of the tongue; other than this no treatment is indicated. An exception to the preceding statement, of course, is in case of status epilepticus. Here treatment should be prompt and if necessary heroic. Sometimes lumbar puncture with drainage of a fairly large amount of fluid is sufficient to abort the convulsions. Sodium luminal or sodium phenobarbital should be given intravenously in sufficient quantity to cause relaxation and sleep. It should be remembered that the margin of safety in the use of phenobarbital is quite wide, and as high as 25 to 30 grains (1.6 to 2.0 Gm.) may be given without ill effect. Sodium amytal is another excellent drug for intravenous use in such cases. Although given almost routinely morphine is never indicated if other drugs are available.

Diseases of the Peripheral Nerves

A number of the diseases affecting the peripheral nerves have necessarily had to be considered in previous chapters, especially those dealing with the deficiency diseases and the intoxications. An effort will be made to treat the remainder of this heterogenous group without reduplication. As regards etiology the majority of these fall under the heading of injury and of infection.

Before considering injuries and infections of the peripheral nervous system some consideration should be given arteriosclerosis. Arteriosclerosis may, and very frequently does, affect the vessels supplying the peripheral nerves in such a manner as to produce a perfectly typical peripheral neuritis. A dominant symptom is that of pain, which may be severe and intractable. It is usually accompanied by some degree of objective sensory disturbance and partial motor involvement. The nerves involved are exquisitely sensitive to pressure. In this connection brief mention should be made of the condition that has been called "diabetic" neuritis. The symptoms of diabetic neuritis are those just described and, of course, occur in patients with diabetes mellitus. On the other hand, such neuritic signs are practically never seen in young diabetics and appear to be entirely independent of the degree of severity of the diabetic condition. It seems extremely probable that this condition is basically an arteriosclerotic one and not connected with the diabetes.

INJURIES OF PERIPHERAL NERVES

Injuries of peripheral nerves may result from a variety of causes and may be both complete and incomplete. A complete lesion of a peripheral nerve is usually sudden, although in rare cases it may be gradual. In the latter case compression by tumor or foreign body is usually the cause. In complete lesions the function of the nerve is entirely abolished below, or rather distal, to the point of injury. There is complete loss of motor and sensory function accompanied by loss of reflexes and by atrophy. A number of trophic changes especially affecting the skin may also be seen. When the lesion is not complete there are signs of motor and sensory disturbance, if the nerve is a big nerve, coupled with evidence of irritation. The irritation usually manifests itself by severe pain or paresthesias. Any nerve of the body may be affected, and obviously the symptoms, as well as the course and prognosis, are largely influenced by the location, extent and degree of the injury. In true peripheral injury, whether complete or incomplete, a certain amount of regeneration is the rule. This is naturally influenced by a number of factors among which infection, scar formation and neuroma formation are the most important. Regeneration of the axones of peripheral nerves is generally quite slow, taking place at the rate of about 1 millimeter per day. Occasionally the peripheral nerves suffer during the course of parturition. The commonest nerves to be affected are those composing the brachial plexus. Traction or other obstetrical manipulations may result in tearing of the roots of the nerves or in compression of the nerves of the plexus by a hematoma. There is usually complete motor paralysis of the extremity involved with comparatively little sensory involvement and a marked degree of atrophy.

The diagnosis of injury to the peripheral nerves is rarely difficult. It is based on a history of a sudden or gradual loss of function in the distribution of a peripheral nerve below a certain point. The involvement may be sensory, motor or mixed, the latter being more generally the case. An exact knowledge of cutaneous and muscular innervation is necessary to accurately determine the degree and the extent of the lesion. The course and prognosis are generally fair but obviously depend to a great extent upon the treatment.

Treatment in cases of peripheral nerve injury is largely surgical. This will not be considered in detail but it may be said that if the nerve has been partially or completely severed it should be sutured. Scar tissue and neuromas should be excised. Tumors or bony overgrowths pressing on the nerve should also be removed. Splinting and exercise, massage and other forms of physiotherapy are usually indicated at the same time.

PERIPHERAL NEURITIS

Disturbances of peripheral innervation due to infection are legion. The specific agent may be well known, such as in the case of diphtheritic neuritis, or it may be quite vague as in the case of acute febrile polyneuritis. At other times we presuppose an infections origin mainly from the clinical symptoms but are unable frequently to definitely determine this.

Acute febrile polyneuritis is very often associated with infections of the upper respiratory tract. It begins with fever, chills, leukocytosis and other evidences of infection; there is a gradual progressive involvement of most of the peripheral nerves, especially of the extremities, with numbness and tingling, pain, motor weakness and diminution and loss of reflexes. Objective sensory disturbances are quite common and usually involve the distal portions of the extremities. At times the infective process involves the anterior horn cells as well, and the spinal fluid shows increase in globulin and increased cells. Prognosis is usually good, although recovery is rather slow. A small percentage of fatal cases have been reported. In these there has usually been evidence of extension of the infective process to the central nervous system proper.

Any of the general systemic infections may be associated with polyneuritis or with neuritis affecting only one or a few peripheral nerves. With the exception of diphtheria such complications are quite rare. The symptomatology and neurological findings are basically those of any type of neuritis. Special mention must be made of diphtheritic neuritis. This condition usually appears several weeks after the onset of diphtheria. The first sign is generally paralysis of the uvula and of the soft palate. There is regurgitation of fluids through the nose and loss of sensation in the palate; accompanying this one frequently sees paralysis of accommodation. There may also appear varying degrees of ptosis and of paralysis of the extra-ocular movements. In more severe cases the paralysis of the pharyngeal muscles and of the laryngeal muscles becomes marked and is evidenced by difficulty in phonation and in deglutition. The phrenic and vagus nerves may also become involved. In the most extreme cases the paralysis spreads from those muscles innervated by the bulbar nerves to the general musculature of the body, and a typical polyneuritis results. This polyneuritis is principally motor in character with marked atrophy and weakness and little sensory disturbance and little pain. The prognosis is generally good, but recovery is slow and may occur over a long period of weeks or months. Death may result from myocarditis or from paralysis of the vagus and phrenic nerves. Treatment should always include the use of diphtheria antitoxin, even though evidence of acute diphtheritic infection may be lacking. General symptomatic treatment as outlined below should also be given.

A particularly common form of neuritis is the one that involves the sciatic nerve. This may be due to pressure by contiguous bony structures, to infection, or, as is so often the case, no definite cause may be found. It manifests itself by severe pain over the course of the sciatic nerve, especially over the sciatic notch and calf muscles. There is usually some weakness of the muscles of the extremity, a few objective disturbances of sensation over the soles of the feet and the dorsum of the feet. The ankle jerk is generally diminished or lost. The dominant symptom, however, is that of severe pain, both spontaneous and on pressure over the nerve trunk.

In the treatment of neuritis of infectious or of unknown origin certain general procedures should be adopted. Acute infection should naturally be combatted, and foci of infection such as teeth and tonsils should be investigated. Treatment is principally by rest and by heat. Massage is contraindicated until all evidence of acute infection or of pain is past. Local neuritic conditions such as sciatic neuritis may be treated by saline injection into the nerve involved. Violent orthopedic measures such as stretching of the nerve under anesthesia are of dubious value. General supportive measures are always indicated and pain should be combatted by appropriate sedatives. Narcotics should be used cautiously, since the condition often persists over a long period and the danger of addiction is generally great.

DISEASES OF THE VEGETATIVE NERVOUS SYSTEM

A consideration of the diseases of the vegetative nervous system is extremely difficult for a number of reasons. To begin with, our knowledge of this system is rather incomplete both anatomically and physiologically. The interrelations with the central and peripheral nervous systems and the endocrine glands are intricate and confusing. In general, pathological changes in the vegetative nervous system are difficult of distinction and of evaluation. Finally, the clinical conditions ascribable to vegetative disturbance are often quite vague and merge one into the other. In view of these facts it is obvious that for the time being emphasis must be placed mainly upon the clinical considerations.

Acroparesthesia usually occurs in women about the time of the menopause. It is characterized by fairly constant feelings of unpleasant numbness and tingling, mild pain and other paresthesias in the extremities, especially the hands. There is no true motor involvement, and objective sensory disturbances are quite rare. In severe cases there may be some hyperesthesia and hyperalgesia. The course of the disease is very slowly progressive. Treatment is entirely by physiotherapy.

Erythromelalgia is a very rare disease that occurs principally in males. It manifests itself by attacks of extreme, sometimes excruciating, pain that is accompanied by marked redness of the feet, sometimes of the hands. It generally runs a chronic course with very little change in symptoms or periodicity. Treatment during the acute attack consists in the application of cold and in elevation of the limbs. In very severe cases periarterial sympathectomy may be attempted.

Raynaud's disease is considerably less rare than the preceding condition but still not common. It is characterized by marked vasomotor changes that precede gangrene of the extremities. The clinical symptoms of local syncope, local asphyxia and gangrene of the toes and fingers is too well known to be described at this point. The pain is usually severe and is frequently accompanied by objective diminution of sensation in the affected extremity. Trophic changes in the skin and nails frequently precede actual gangrene. In mild cases treatment is symptomatic; in the more severe ones thoracic or lumbar sympathectomy should be seriously considered.

Scleroderma is another rare disease which is probably dependent upon interference with vegetative function. The skin becomes extremely indurated and atrophic, the atrophy usually involving the subcutaneous tissues and sometimes even the muscles and bone. The skin becomes extremely tense and if the condition involves the face usually results in a fixed, expressionless stare. Every conceivable form of treatment has been tried but so far to no avail.

Angioneurotic edema is a condition that usually affects young people and is characterized by the rather sudden appearance of areas of edema anywhere in the body. It frequently involves the face, the eyelids, the glottis and the tongue; it seldom persists for more than one or two hours and is rarely dangerous. An exception to this statement is in those cases in which the edema affects the glottis and trachea. Intubation and tracheotomy are sometimes necessary to preserve life. Treatment is usually by injection of ephedrine or adrenalin.

Facial hemiatrophy manifests itself by atrophy of all of the structures of one side of the face. It usually occurs in females at a fairly early age and is very slowly progressive. The skin, glands, subcutaneous tissues, muscles and even the bony framework of the skull are affected. There is no known treatment.

Progressive lipodystrophy is more frequent in females than in males. It is essentially a progressive loss of the subcutaneous fat of the upper portions of the body, the face, neck, arms, torso and trunk; the pelvic girdle and lower limbs are as a general rule unaffected.

Adiposis dolorosa or Dercum's disease appears as a symmetrical extreme increase in subcutaneous fat accompanied by pain and by weakness. It is almost exclusively confined to women. Treatment is entirely symptomatic.

Hirschsprung's disease or congenital megacolon is a vegetative disturbance manifested by extreme increase in size and loss of tone of the colon. Treatment is usually by lumbar sympathectomy, and a number of good results have been reported recently.

In the preparation of these articles a number of references, both texts and original articles, have been consulted and freely borrowed from. It is impossible to mention them all in detail but I wish to express especial indebtedness to the neurological texts of Grinker and of Wechsler and to the neuropathological works of Walter Freeman.

The Treatment of Diabetes Mellitus.—During the last 15 years there has been a gradual revolution in the problem of the treatment of diabetes, because there are so many more diabetics to treat and because they live so much longer. There are more diabetics to treat, half again as many more as shown by mortality tables, because the country is aging rapidly and thus approaching the maximum age of diabetic incidence—50 to 55 years. Whereas, in Boston in 1845, 80 per cent of all the people died under the age of 40 years, in Massachusetts, in 1935, 80 per cent of all the people died above the age of 40 years.

We are detecting and diagnosing more cases. In Massachusetts, we have 15,000 diabetics and our incidence is a third greater than that in Minnesota, and why? Perhaps age is somewhat of a factor, but I think a more important reason is the discovery of cases hitherto unknown. And I believe in your admirable pamphlet on "Diabetes—How to Make it Harmless," if you should replace one half of 1 of the 20 pages devoted to Diets with a few captions—

> Diabetes, like consumption, is most successfully treated if discovered early.
> Diabetes is hereditary.
> Does anyone in your family show sugar in the urine?
> Find out and if so call the doctor.

the incidence of diabetes in Minnesota would rise. Whether it would reach the Massachusetts level, I do not know, since diabetes, like coronary thrombosis, is less common among those doing heavy, laborious work and you have more working on farms than in factories and likewise, I presume, a less urban population.

Incidentally, in various other countries, diabetes is growing more rapidly than in the United States and eventually its incidence in these may reach our own. For example, in Italy, in 10 years, it jumped 82 per cent, from 4.5 per 100,000 in 1920 to 8.2 per 100,000 in 1930.

Now turn to the other factor which increases the number of diabetics in a community at any given time—namely, that dependent upon the duration of the disease. Of course, diabetics live longer today. Take the 1,243 living diabetic veterans studied by Matz. Already they have lived on the average of 9.1 years and those of you who are paying for those little Bonus Bonds in June can estimate whether they, with their present and future pensions, will live longer or shorter than you who provide them. . . .

The indications for use of protamine insulin.

1. A trial should be made with diabetic patients of recent onset, because it is probable that such patients can be controlled with a single daily dose protamine insulin from the beginning of treatment. Indeed it is our impression that we will never learn what protamine insulin can do until we use it as a remedy *sui generis* and observe patients treated with it exclusively over a period of years.
2. High fasting blood sugar values are a definite indication because of the great advantage to a diabetic in beginning his day with the nearly normal metabolism indicated by a normal blood sugar.
3. Multiplicity of dosage can be avoided by the use of protamine insulin and the consequent gain in simplicity and convenience of treatment improves the end-results.
4. Sensitivity to insulin as indicated by frequency of reactions constitutes the fourth major indication.
5. Hepatomegaly is an indication, because of the efficacy of protamine insulin in reducing the size of the liver, reported by Hanssen.
6. Lipodystrophy may be favorably affected by the reduced number of injections and lessened acidity of the preparation.
7. Finally, it may prove to be of especial value in mild diabetics, in patients with hyperlipemia, cardiac cases in whom hypoglycemia should be avoided and for the same reason where there are occupational hazards.

Conclusion.—With protamine insulin the fundamentals of treatment of diabetes are not changed, but the ideals of treatment are more nearly achieved. Diabetes today is a disease to be respected and neglect to do so spells disaster. Diet and exercise are as essential as ever. The patient must not overeat, but it seems likely that having determined the insulin dosage for a given quantity of carbohydrates, the protein can be determined by adjustment to the age and size of the patient, the fat regulated by body weight, and even the carbohydrate can vary 10 to 20 per cent up or down with comparative impunity.

The simplicity of administration of insulin in 1 or 2 doses instead of 2, 3 or 4 doses will appeal so generally to patients that the probability is strong that the number of diabetics taking insulin will increase. As a result, the percentage of deaths from coma should fall at an accelerated pace.

The original hope that protamine insulin would be safer, because of the lessened number and severity of insulin reactions which it engenders, has been confirmed. . . .

Extract from article by Elliott P. Joslin, M.D., Boston, Massachusetts, *Minnesota Medicine*, September, 1936, p. 570.

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CHRONIC RHEUMATISM

In the chronic disease category, along with cancer, diseases of the heart, tuberculosis and nephritis, must be considered the chronic arthritides. Although not receiving the general attention chronic diseases (such as cancer) having high immediate mortality are getting, chronic rheumatism nevertheless produces marked disablement and is to the community of no little medical, social and economic importance and should be more and more given the consideration by both the public and profession it deserves. There is a vast need for impressing both the general practitioner and the layman with the fact that in a large measure its ravages may be prevented; that persistence, and knowledge, not only of the physical background of the general constitutional disease which is present but of the psyche of the sufferer, are necessary. Especially should these factors be recognized and appropriate treatment applied before irreparable joint deformities result. The physician is confused by the multiplicity of classifications with the synonymous terms that must be learned so as to speak intelligently in professional circles. If he would travel, consult or read articles beyond his own restricted area, a knowledge of the variant terms must be possessed. Virchow's arthritis deformans, which covers two rather distinct clinical entities, i.e., the type of joint disease which reaches its peak of incidence in the age group of 30 to 40 years and the type chiefly attacking the senescent in his sixth decade, is still freely used; especially is this true in Germany.

Rheumatoid arthritis (England), atrophic arthritis (American), proliferative arthritis (the pathologist), are synonymous for the type afflicting the earlier age group type. Hypertrophic arthritis (American), degenerative arthritis (the pathologist) or osteo-arthritis (England) distinguish the type afflicting the older individual. Virchow would seem to have included under his general descriptive term, arthritis deformans, separate disease entities with different etiological background and different age incidence. There are also found in the nomenclature the eponyms, Still's disease, a nondescriptive term for the rheumatoid arthritis occurring in children, and Strümpell-Marie's disease (atrophic spondylitis), a disabling type of chronic arthritis affecting the adult spine. Add to the above certain specific acute infections, such as gonorrhea, pneumonia, tuberculosis, etc., with a resulting chronic arthritis, one may then have a summary of the broad field of clinical conditions the term chronic rheumatism connotes. As there is but a slight mortality, rated as 1 to 40 with sufferers of cancer, mortality and morbidity statistics are, as a consequence, not available in this country. However, in England from the compulsory insurance tables it is ascertained that of every 1,000 males insured, 1 has rheumatoid and 3 osteo-arthritis; of 1,000 females, 3 have rheumatoid and 2 osteo-arthritis. The facts would seem to indicate that the atrophic type is an inflammatory infectious disease. The frequency with which a form of Streptococcus is found concomitantly by many observers, the round-cell infiltration present microscopically, and the recent studies by Hartung and Bruger, which show diminished blood cholesterol, support this conclusion. Contrariwise the joints of the hypertrophic type exhibit the signs of mechanical strain with degeneration. Injuries as in "baseball finger" predispose. Then, too, the blood cholesterol is found to be increased as it is commonly in degenerative disease. In short, many of the changes in the hypertrophic type may be considered exaggeration within the joints of the degenerative changes one would expect in senescence. Keefer, in a paper, "The Methods of Value and Diagnosis of Chronic Arthritis," read before the Medical Society of the District of Columbia on October 10, 1934, plainly showed from protocols of hundreds of necropsies that the majority beyond 50 years of age exhibited joint changes with a much smaller percentage having symptoms during life. He who has to endure the rigors of severe winters with bad hygiene and poor food, and above all he who suffers mental strain, worry and frequent emotional explosions accompanying anger and grief with their metabolic implications, is peculiarly susceptible. In the sixth edition of Jelliffe and White's book one reads: "The psychogenic discipline is also commencing to show that purely emotional reactions extend deep down in the individual's metabolic processes and must be evaluated in the study of chronic arthritic processes."

The matter of foci of infection, although of general importance, should not be unduly stressed. The pros and cons concerning the strain that surgery might inflict should be weighed. Vaccine treatment used intelligently apparently yields on occasion results in the atrophic type. The theory of sulphur deficiency with consequent improvement with sulphur injection is not broadly accepted. The disease has frequent marked remissions giving opportunity in the evaluation of any mode of treatment for the *post hoc, ergo propter hoc* fallacy. The recent instances of the lay press giving space to new chemical cures may have been actuated by such logic. The mental side is treated or relieved often by practices of the type represented by the Canadian foot manipulation. Hundreds of Americans leave their family physicians or specialists, travel afar to get in this way the mental help they have failed to obtain at home. Rest, exercise, diet, environmental situations, which may have harmful effect on the patient's sympathetic nervous system, with resulting maladjustment of the heat regulatory capillary circulation, should be supervised. Withal there should be a knowledge of the complexities of the situation and a recognition of the makeup of the individual especially predisposed. There is an American Association for the Study and Control of Rheumatic Diseases functioning with the result that authoritative information concerning general statistics and the present knowledge concerning etiology and treatment is available both to the public and the profession. Recently there was an International Congress on Chronic Rheumatic Diseases, which tended to bring a simplification of the nomenclature and a better understanding of the many problems involved. Of much help are books written in language understandable by the intelligent layman. In general, it may be said, of no small import is the discouragement noted not only by the patient and his family but by the doctor in long drawn out chronic illness. The economic tragedy exhibited in the instance of the patient who travels from his home doctor to specialist to clinics to charlatans and then mayhap back to his own family physician, quite bankrupt physically and morally, is too often repeated. Books which tell the story well and truly are helpful and should be placed in the hands of the patient and his family. Maurice F. Lautman's "Arthritis and Rheumatic Diseases"* is such a book and may be recommended.

BIBLIOGRAPHY

Hartung, E. F., and Bruger, M.: Cholesterol Content of Plasma in Arthritis. J. Lab. & Clin. Med., 1935, **20**, 675.

Kuhns, J. G., and Joplin, R. J.: Convalescent Care in Chronic Arthritis. New England J. Med., 1936, **215**, 268.

Nissen, H. A., and Spencer, K. A.: The Psychogenic Problem (Endocrinal and Metabolic) in Chronic Arthritis. New England J. Med., 1936, **214**, 576.

COMING MEETINGS

Thursday, October 1: *The Section on Neurology and Psychiatry.*

1. "Alcohol Injection of Lumbar Sympathetics in Peripheral Arteriosclerosis." William Y. Baker, M.D.
2. "Prefrontal Lobotomy in Agitated Depression. Report of a Case." Walter Freeman, M.D., and James W. Watts, M.D.

Wednesday, October 7: Business Meeting. Reports of committees, etc.

Wednesday, October 14: The speaker will be Edmund A. Walsh, S.J., D.D., LL.D.

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* Whittlesey House Health Series, McGraw-Hill Book Company, Inc., publishers, with a foreword by Morris Fishbein.

Wednesday, October 21: 1. "Observations on the Use of Insulin. Proteinate in the Treatment of Diabetes Mellitus." Case reports illustrated by lantern slides. William J. Mallory, M.D., John A. Reed, M.D., and Maurice Protas, M.D.

2. "Recent Advances in Proctology." Illustrated with lantern slides. Garnet W. Ault, M.D., Professor of Proctology, Georgetown University School of Medicine.

Wednesday, October 28: Joint meeting with the Baltimore City Medical Society. The Medical Society of the District of Columbia will act as host. The scientific program will be furnished by our Baltimore guests. Make note of this event. The local profession will, we feel sure, want to do everything possible to make our fellow-practitioners feel at home while in Washington. Buffet supper will be served.

The Program:

1. "Recent Cases of Isthmus Stenosis of the Aorta." Lantern slides. John T. King, M.D. Discussion to be opened by Milton B. Kirsh, M.D.
2. "The Treatment of Peripheral Vascular Disease by Passive Vascular Exercise." Lantern slides. George H. Yeager, M.D. Discussion to be opened by Arthur M. Shipley, M.D.
3. "Perforative Gastric and Duodenal Ulcers." Harry C. Hull, M.D. Discussion to be opened by Frank S. Lynn, M.D.

THE EXECUTIVE COMMITTEE

Recent appointments to subcommittees by Dr. J. Lawn Thompson, Chairman:

Bequests. Augustus C. Gray, Chairman; Oscar B. Hunter, Joseph Horgan.

Budget. A. B. Bennett, Chairman; A. J. B. Connolly, David Davis.

Business Affairs. William T. Gill, Jr., Chairman; Raymond T. Holden, Jr., Thomas E. Neill.

Davidson Lecturer, Selection of. Sterling Ruffin, Chairman; Oscar B. Hunter, Raymond T. Holden, Jr., A. J. B. Connolly.

Reference. Coursen B. Conklin, Chairman; William Mercer Sprigg, J. Lawn Thompson.

NEWS AND PERSONALS

William Cline Borden Memorial Lectureship on Surgery

On behalf of Mrs. William Cline Borden and Dr. Daniel L. Borden, funds for the endowment of the William Cline Borden Memorial Lectureship in Surgery were formally presented to President Cloyd Heck Marvin at a meeting of the George Washington University Medical Society held on the evening of May 16, 1936, by Dr. William J. Mallory, Professor of Medicine. Dr. Mallory's address follows:

"It is easy to praise a man whom we admire, but when, in addition to admiration, there is personal inclination and affection, we search for some expression more satisfying than mere laudation. So, while introducing the name of Dr. William Cline Borden this evening, it is more fitting that you should have some picture characteristic of his relations to this school of medicine than that you should hear repeated what you all feel and know concerning him. When he came here he found our school dominated by strong and useful personalities. Inevitably every change in personnel left it shaken. He left it an institution, an organization resilient and efficient. Like the soldier and diplomat that he was, he practiced 'the philosophy of the possible' in the present, and held visions and plans for the future commensurate with our enlarging opportunity. On the centennial of this school he said, in conversation, that the capital city of the greatest nation would some day have an institution of learning of proportionate size and worth, and that some great man would see this opportunity and make his name immortal by endowing such a foundation. The action of the Borden Family, endowing a lectureship on surgery in his name is in complete harmony with this vision.

"President Marvin, I have the honor to speak for Mrs. William Cline Borden and Dr. Daniel L. Borden, and in their names offer to the George Washington University funds for the endowment of the William Cline Borden Memorial Lectureship in Surgery."

Army Medical Library Centennial Celebration will be held in the library building on November 16, 1936. Formal ceremonies are planned in commemoration of the establishment, in 1836, of the library which was destined to have great influence on medical progress and prestige in America.

Dr. Arthur C. Christie was recently elected to honorary membership in the Societa Italiana di Radiologia Medica and in the Deutsche Röntgen-Gesellschaft, the national radiological societies of Italy and Germany respectively.

Dr. James A. Flynn of this Society and Dr. I. W. Steele of the United States Public Health Service were appointed by the State Department as delegates to the Third International Congress of Throat, Nose and Ear Specialists, which is now in session in Berlin, Germany. Dr. Flynn presided at one of the recent sessions. The International Congress has been meeting every 4 years; the initial session was held in Copenhagen in 1928.

THE AMERICAN BOARD OF INTERNAL MEDICINE

The American Board of Internal Medicine, incorporated February 28, 1936, completed its organization on June 15, 1936. The officers chosen were Drs. Walter L. Bierring, Des Moines, Chairman; Jonathan C. Meakins, Montreal, Vice Chairman; and O. H. Perry Pepper, Philadelphia, Secretary-Treasurer. These officers with the following 6 members constitute the present membership of the Board: Drs. David P. Barr, St. Louis; Reginald Fitz, Boston; Ernest E. Irons, Chicago; William S. Middleton, Madison; John H. Musser, New Orleans; and G. Gill Richards, Salt Lake City. The term of office of each member will be 3 years, and no member can serve more than 2 consecutive 3-year terms.

The first written examination will be held in December, 1936, and candidates successful in this written test will be eligible for the first practical or clinical examination which will be conducted by members of the Board near the time for the annual session of the American College of Physicians in St. Louis in April, 1937. The second practical examination will be held at Philadelphia near the time of the annual session of the American Medical Association in Atlantic City in June, 1937. The fee for examination is $40.00 which must accompany the application and an additional fee of $10.00 is required when the certificate is issued.

Application blanks and further information can be obtained by addressing the office of the chairman, Dr. Walter L. Bierring, 406 Sixth Avenue, Des Moines, Iowa.

Boyce Richardson Bolton, M.D.

(1892-1936)

Dr. Boyce Richardson Bolton, a member of the Medical Society of the District of Columbia since March 28, 1921, died on August 16, 1936. He was graduated from George Washington University School of Medicine in June, 1917, accepting a commission in the United States Army in August, serving until September, 1919. He attained the grade of captain at the time of discharge. He was a major in the Reserve Corps at the time of his death. Following his army service he served on the house staffs of George Washington University and Episcopal Eye, Ear & Throat Hospitals. At the time of his death he was Assistant Professor of Otorhinolaryngology at George Washington University School of Medicine, and attending laryngologist and otologist at Children's and Episcopal Eye, Ear & Throat Hospitals. Dr. Bolton is survived by his widow, Mrs. Agnes Bolton, and two daughters, Alice and Mary Elizabeth. His brother, Dr. Robert M. Bolton, is a member of this Society.

Charles McCauley Emmons, M.D.

CAT

(1873-1936)

Dr. Charles McCauley Emmons, who had been a member of the Medical Society of the District of Columbia since 1902, having become a member of the Medical Association of the District of Columbia in 1895, died May 29, 1936, at his home in Suitland, Maryland. He was graduated from Georgetown University School of Medicine in 1893, later receiving the degrees of LL.B. and LL.M. from the National University and the Washington College of Law, respectively. He became a Life Member of the Society on January 1, 1936. He is survived by his widow, Mrs. Mary E. Emmons, a daughter, Miss Elizabeth S. Emmons, and two brothers, George Emmons of Ross, California, and Richard Emmons of this city.

John James Wharton, M.D.

CAT

(1873-1936)

Dr. John J. Wharton, internist, died after a long illness on August 14, 1936. He was a native of Culpeper County, Virginia, studying medicine at George Washington University where he was graduated in 1905. He later served an internship in the University Hospital. He became a member of the Medical Society of the District of Columbia at the time of the amalgamation of the Medical Association of the District of Columbia and the Society in 1911. His membership in the Association began October 31, 1907. His was a genial personality gaining for him many friends. He was at the time of his death a member of the National Press Club, Sons of the American Revolution, the William R. Singleton Lodge of Masons, the Racquet Club and the Men's Club of St. Alban's Church. He was a charter member of the Washington Heart Association, also a member of the George Washington University Medical Society. Dr. Wharton is survived by his widow, Mrs. Catherine C. Wharton; two sisters, Mrs. William Harrison Lamb and Miss Mary Wharton, and a brother, Daniel Wharton, all of Manassas, Va.

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CONSTITUTIONAL FACTORS IN MENTAL DISORDERS*†

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The problem of mental disorders may be attacked from two main angles. One is the psychological approach upon which psychiatry and psychoanalysis are based. Those who follow this method investigate the workings of the mind, the psychological mechanisms of regression, conversion, conflict, projection, repressions, etc., together with mental functions, such as memory, judgment, attention and the like. The approach is intrinsically psychological. The other method of approach is the organic. By this route, investigators attempt to determine the bodily factors that are operating to maintain a particular personality or set of psychologic phenomena. Both methods are justifiable and necessary since the interpretation of each intricate psychological phenomenon upon the basis of physical changes in the organism is as yet impossible.

During the past 10 years, as a confessed organicist, I have attempted to attack the problem of the psychoses along four different lines, in the hope that by a study of the physical aspects of patients presenting mental disorders some ray of light might be shed upon their etiology. These lines of attack have been the anthropologic, the nosologic, the endocrine and the chemical. These are by no means the only possible approaches upon which the organicist may focus his attention. Much work still needs to be done, in electrophysiology, in animal surgery, and with new methods in pathologic anatomy; and much more work needs to be done along biochemical lines, and by the "co-twin control" method in genetics.

The idea dominating my own work has been the constitution of the mental patient, the biology of the individual, his physique, his susceptibility or resistance to disease, his endocrine endowment, and his chemical peculiarities. Working with large numbers of patients thoroughly examined both before and after death, dividing them into more or less homogeneous groups, comparing the findings in one group with those in another according to biometrical principles, I have come to believe that fields hitherto left unexplored have been at least opened up for future sowing and reaping, or, on the other hand, demonstrated to be sterile.

The constitutional and endocrine studies have been carried out on some 1,400 psychotic patients submitted to necropsy during a period of 10 years. It became apparent at the beginning of the study that the number of cases belonging to one or another of the categories of mental disease would be too few in number to allow of any important deductions being made within a reasonable period of time. Furthermore, the problem was one of constitution, rather than one of etiology in the narrow sense; and since constitution transcends age, sex, and race, the patients in certain studies were grouped together irrespective of these factors. In a large proportion of the cases the etiology of the mental disease was sufficiently well established. These cases, I believed at the time and demonstrated later, could be of very definite use in determining constitutional factors that were present also in those cases in which the etiology of the disease was obscure. For instance, a patient who developed a schizophrenic psychosis at the age of 20 and died of arteriosclerosis at the age of 70 was considered to be classifiable with a patient who developed a schizophrenic psychosis at the age of 69 and died of arteriosclerosis at 70. In each one, the constitutional tendency to develop this particular type of mental reaction was present, the principal difference being that in the aged schizophrenic the break in cerebral "compensation" took place probably as a result of impaired cerebral nutrition, while that of the youthful individual took place in response to some as yet unknown etiologic factor. If some physical disorder, some constitutional peculiarity, some common denominator of endocrine pattern, chemical relationship or disease susceptibility could be disclosed in the two cases, we should be one step nearer the solution of the etiology of the mental reaction type as a whole.

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* Chairman's Address, read before the Section on Neurology and Psychiatry, May 28, 1936.

† This address appears in two instalments, of which this is the first.

Hence, since this was a constitutional study, the patients were grouped according to their behavioristic reaction types without regard to the etiology of the disorder. In the few tests made to ascertain whether this premise was valid or not, there was satisfactory concordance. For example the incidence of tuberculosis among the symptomatic schizophrenics was almost as high as among the idiopathic schizophrenics, and the weight of the heart was nearly identical in the two groups. It was a reasonable assumption, therefore, that the underlying constitutional peculiarity was present in both individuals.

With this proposition advanced, I shall proceed to the consideration of personality types and then their correlates in structure, susceptibility to disease, endocrine pattern and chemical peculiarities.

PERSONALITY CLASSIFICATION

Under this heading it is not enough to say that a person has a strong personality or a weak personality, however much these terms may convey to the wishful-thinking reader of success magazines. A strong dynamic personality may so handicap an individual that he never accomplishes anything except to impress his friends with his good-fellowship; whereas a man with a weak personality, in the accepted sense, may dream dreams that will change the course of history. It is not so much the dynamism of the individual that determines the classification, as the method by which the individual reacts to his external environment. This method of reacting to his surroundings constitutes his behavior, and a penetrating analysis of this behavior is necessary at times to uncover the basic trends. This is especially the case in civilized communities where so much pressure is placed by society upon the individual that he must necessarily conform more or less closely with his fellows. When the controlling influences of the mind break down and mental disease results, the basic trend often becomes much more evident, so that classification is facilitated. I wish to express to Dr. Nolan D. C. Lewis my appreciation for his assistance in determining these basic personality trends in the patients coming to necropsy.

Four outstanding personality types have been chosen as the most common examples of how men react to the external world. These may be called the schizoid, paranoid, cycloid and epileptoid personalities. Difficulties have been encountered in the classification on account of the mental symptoms referable directly to the disease of the brain. If a patient became aphasic as the result of a stroke, not only was the examination rendered difficult on account of the closed channels of communication, but also because his behavior was considerably modified. Dementia paralytica offered the most difficult problem on account of the mental symptoms due directly to the inflammatory and degenerative changes in the brain. In some instances the excitement of the paretic may have been interpreted as the manic phase in a cycloid temperament, and in other instances the convulsions may have led to the patient's classification in the epileptoid group, whereas had the paretic process been arrested a different personality reaction might have been disclosed. This uncovering of a very distinct mental reaction in paretics is a fairly common aftermath of the malaria treatment. I have endeavored whenever possible to remove the paretic excrescence in order to observe the more fundamental personality behavior.

The material upon which this study is based is the autopsied population of St. Elizabeths Hospital over a period of about 10 years. The data, strictly speaking, apply only to psychotic patients, but I maintain that psychotic individuals differ from normal people only in degree, and that the same psychologic trends can be found in mentally healthy individuals if they are sought. Certainly, the earlier history of the patients in the institution very often indicates the development of behavior trends in one direction or another long before hospitalization became necessary.

Mental Reaction Types

Individuals may be assigned to one or another of the 4 psychologic types by their manner of living and thinking. The schizoid individual is a shut-in, dreamy person, timid, unambitious, fond of regularity and ritual in life, inoffensive, yet resistive to change even to the point of stubbornness. The paranoid individual is aggressive, arrogant, the kind that harbors a grudge and gets even. He explains his failures through the machinations of others, works hard, often bitterly, for appreciation, is ambitious, proud, sensitive, even suspicious, takes offense easily and makes friends with difficulty. The cycloid individual enjoys human companionship, is a good mixer, gladdened by a good turn of affairs. Periods of tremendous energy often alternate with others of moody inertia. He functions best among people, makes snap judgments, is incapable of prolonged application except when the task delights him. The epileptoid individual is affected by sudden unexplained outbursts of various types, especially convulsive seizures, but also headache, anger, asthma, etc. He is apt to be pedantic, devout, egocentric, and often combines these with lack of emotional tone or feeling power.

Mixtures of these types are often found, especially of the cycloid with paranoid characteristics, and often of the epileptoid with schizoid or paranoid elements, but it is usually possible to recognize the outstanding personality characteristics.

How does one recognize psychologic types? Some are instantly apparent; some are recognized in the first 10 minutes, some not in 10 hours or in 10 years. It is in the 10-minute class that the rules of constitutional susceptibility will be found most valid.

A few well-directed questions in regard to the past and social history will orient the examiner. These may be worked in without doing violence to the scheme of recording the history, and without distracting the patient. For instance: Do you drink liquor? How much? How does it affect you? The answer to the last question will be much more interesting, since the true character of the man is often made evident when the veneer of civilization is dissolved by alcohol. The cycloid is sociable, gay; the schizoid solemn, sleepy; the paranoid, morose; the epileptoid may convulse.

Have you had any accidents? Any family reverses? Do you blame yourself or other people when things go wrong? The schizoid blames himself, grieves in silence, hides his disgrace, and waits for something to turn up. The paranoid blames his boss, or believes his fellow-workers or some influence caused his reverse. As a schoolboy the teachers had it in for him. The cycloid is downcast, tells everybody of his hard luck, relaxes in alcohol or other diversion, then pulls himself together and runs for office or gets a job selling stock. The epileptoid goes over and over the details of his misfortune but is apt to be emotionally indifferent.

Have you had any venereal disease? Are you strongly sexed? What is your attitude toward the opposite sex? The cycloid is often promiscuous, enjoys the society of the opposite sex. The schizoid idealizes or dislikes them; the paranoid holds them in contempt or shuns them. Yet all may be making a good marital adjustment.

How do you get along with members of your own sex? The cycloid has a large circle of friends, makes them easily, takes them at their own appraisal; the paranoid makes few, is suspicious, although at times almost gullible; the epileptoid is dependent upon one or two; the schizoid prefers to be by himself.

What is your occupation? What hobby do you ride? The patient's avocation is frequently a guide to his character. Constructive arts appeal to the cycloid; reading and nature study to the schizoid; his business to the paranoid. The collecting mania is seen in the schizoid and paranoid. Psychoanalysis explains the hoarding of old and useless things as a socially acceptable sublimation of anal eroticism. Wohlgemuth speaks of the psychoANALists.

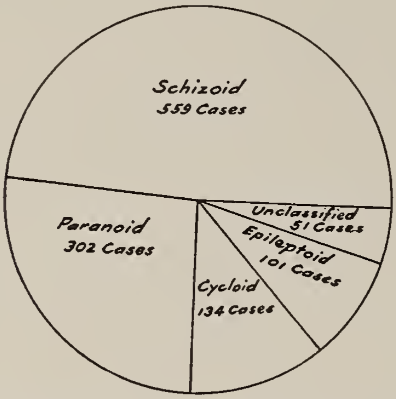


Fig. 1. Distribution of 1,147 Cases According to Personality Type, Male and Female, White and Negro, All Ages

Are you worried over your business or finances? What would you do if somebody gave you $100,000.00? "Go around the world," says the cycloid, "buy a house; buy a car; get married." "Pay my debts; invest it; take a course," said the schizoid. "See my lawyer," says the paranoid, or "buy out the boss."

Are you easily depressed? Are you suspicious of others? Are you easily embarrassed? Are you religiously inclined? Ten minutes of sympathetic questioning of a coöperative patient will bring out sufficient material to give the examiner a lead to the manner in which the patient reacts to his environment.

The above outline might be used in the study of non-psychotic individuals. Actually the patients investigated were studied much more comprehensively in the psychiatric services and often observed over long periods of time. Except in a very few cases of unusual type, the personality reaction of the patient did not alter during the period of observation, although in the process of deterioration, certain of the more outstanding characteristics of the mental reaction were impaired, and perhaps finally lost. I give the above set of questions and answers merely to orient the reader with regard to the different personality types.

There are undoubtedly other personality reaction types. Whether any one may be set up independently of the four described is somewhat doubtful. The hysteric has a certain splitting of the psyche that is akin to that of the schizophrenic, although intellectual deterioration apparently takes place very late if at all. The psychasthenic and hypochondriac are certainly closely related to the schizophrenic. The psychoneurotic comes the closest to a separate category, although he reveals traits of the cycloid, while the constitutional psychopath and certain criminal types often harbor ideas that border upon delusions of persecution and hence are allied to the paranoid.

The relative incidence of the various personality reaction types is shown in Figure 1. In these studies the patients have been grouped without regard to age, sex, race or etiology of the psychosis. About half of the cases are schizoid and a quarter are paranoid, while cycloid and epileptoid cases are fewer in number, and certain subjects have been impossible to classify.

It is now possible, with the problem stated and the personality groups defined, to take up the question of the constitutional factors lying behind or coördinated with the behavior manifested by the individual groups. I shall take up in turn the problems of bodily architecture, susceptibility or resistance to disease, weight of the endocrine glands, and certain biochemical phenomena that I have designated under the term, Psychochemistry.

ANTHROPOLOGICAL STUDIES

There are tall men and short men, thin men and fat men, and a large group of in-between men that extends from one end of the scale to the other. An examination of the series of autopsied cases was undertaken in order to determine if possible what relationship there might be between physical growth and mental reaction type.

There is a saying: One man's meat is another man's poison. This will be recognized as a crude statement of the constitutional peculiarities and differences of various members of the human species, and is another example of the penetrating insight of the folk-lore poet that precedes the slow march of science. Where science goes beyond the philosopher is in asking why and then proceeding to find an answer.

For purposes of this study we may paraphrase the saying somewhat as follows: The more nearly two individuals resemble each other, the greater are their chances of developing the same disease. It is highly probable, for instance, that we are all exposed to tuberculosis at some time in our lives, yet only a certain proportion of us develop the disease. Among those that do there is often a general family resemblance. We go through life on very much the same routine of eating, working and sleeping, and some of us develop hypertensive disease and others acquire gallstones, and some develop diabetes or cancer. A study of the body form in patients suffering from these diseases will often show underlying trends in them that bring them into rather close relationship with one another. Draper believes he can designate a peptic ulcer race, a gallbladder race, a pernicious anemia race, and more recently a poliomyelitis race, based particularly upon the characteristics of the face, the measurement of the gonial angle, the interpupillary distance, the length of the middle face, etc.

Applying the same methods to the study of patients with mental disease has brought Kretschmer, as well as Wertheimer and a number of others to the conclusion that there are correlations between physical form of the body and mental reaction type.

PHYSICAL TYPES

The asthenic individual is the tall thin person with poorly developed musculature and a narrow costal angle. The head is dolichocephalic, the face a long oval with a considerable distance from the eyebrows to the dental margin (middle face), and a rather narrow interpupillary distance. Hair is usually abundant on the head but scant on the face and body. The shoulders project away from the sides and the ribs almost touch the crests of the ilia. The feet and hands are long and slender.

The pyknic individual stands at the opposite end of the scale. He is short and thick-set, with well-developed muscles, broad shoulders and narrow hips, a full fatty panniculus, much hair on the body and face with a tendency to early baldness and often a rather high voice. The outline of the trunk runs in a smooth curve from the neck to the elbows, the hands and feet are short and stubby, and there is a magnificent paunch. The face is moon-shaped and florid, the middle face short and the head more rounded.

The athletic type stands between the two extremes, being, on the whole, more gracefully proportioned.

The dysplastic type does not fit into any of the above three groups by reason of combination of asthenic and pyknic traits, or because of abnormalities of body that stamp him as distinctly freakish. Sometimes a man is seen with the shoulders of an ox, and long spindly legs, or the reverse, a thin flat chest and long face combined with short stout legs and wide hips. Some men are constructed along feminine lines, and some women are shaped like men, having small breasts, narrow hips and a poorly developed fatty panniculus, exposing the muscular contours. Of the freaks, little need be said since, although few in number, they are large in variety, and usually have some endocrine abnormality or nutritional disease as a basis.

A comparison of the physical and psychologic types is of interest and tends to confirm the findings of Kretschmer. The asthenic habitus is most often associated with the shut-in schizoid personality trend, while the pyknic habitus and the extrovert cycloid personality run together. Furthermore, there is quite a predominance of dysplastic individuals among the epileptics, and the paranoids show a rather even distribution among all four classes with pyknics and athletics almost even. The small percentage of asthenics among cycloids and of pyknics among the schizoids forms the reverse of the preceding picture (Fig. 2).

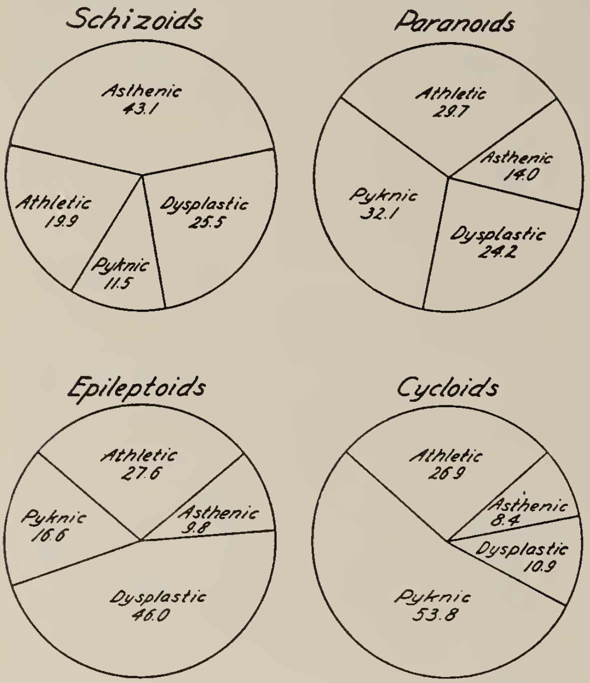


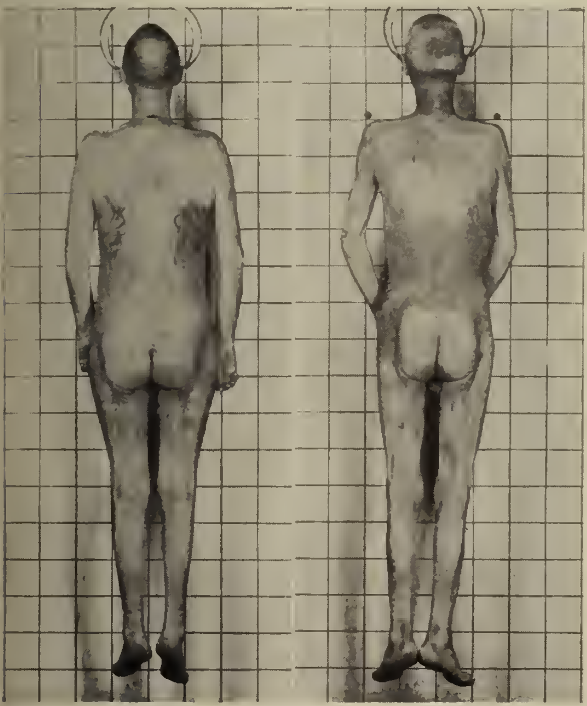
Fig. 2. Pie Diagrams Indicating Physical Make-up of the Several Psychologic Classes

It is evident, therefore, that there are certain tendencies for the physical conformation of the body to go hand in hand with corresponding modes of reacting to external stimuli, in other words, of form and behavior, body and mind.

Another way of approaching the problem of the relationship of body build to mental reaction type is to determine the incidence of growth disorders among people of varying psychologic types. Wertham has emphasized this aspect particularly. In an anthropologic examination of 923 cases of mental disease he found one or more anomalies of growth, or disproportionate development in 21 per cent. The incidence was the highest in schizophrenics (36 per cent) and lowest in manic-depressives (2 per cent). Paranoids were 29 per cent and epileptoids 26 per cent. In my own material the anomalies were not so broadly defined, and hence less numerous. Indeed, as already mentioned, the epileptoid group showed the largest percentage.

It is interesting to speculate upon the relationship of bodily growth to mental reaction. From common observation we have come to associate a compact build with considerable energy endowment, whereas the lanky, loose-hung individual is usually considered below normal in his tolerance for work. The many exceptions to this rule, however, destroy its usefulness. What is of importance in this respect is the more harmonious bodily development of the cycloid individuals. They are not all Adonises by any means, but in comparison with the schizoids, the cycloids have more agreeably designed bodies (Figs. 3(a), 3(b)). Drawing the homology between mind and body again, we see in these cycloids, a perturbation of the psyche characterized principally by great swings in general activity and in mood, but without distortion of the personality. It is just this distortion that characterizes the schizoid and paranoid psychoses and makes them so incomprehensible to the average layman. As for the epileptoids, their behavior is probably the least predictable of any, and their characters the most confusing and variable. Certain features of the epileptic psyche, however, are apparently due to the repeated insults to the brain in the form of intense vascular changes associated with the convulsive seizures. These develop during deterioration, and are particularly manifest in monotony of ideas, rigidity of character and loss of intellectual activity.

Whether people who bear unusually close physical resemblance to one another carry the same potentialities for behavior is a problem worthy of study. If any of you is afflicted with a double, study him well and observe how closely his method of thinking and his general behavior coincide with your own. I recall a convivial evening across the river from Detroit during the prohibition era. Stories were flying thick and fast, especially thick. There were two men seated opposite one another who displayed an extraordinary physical resemblance although they lived in different cities and came from different national stocks. Not only were these men both physicians, they were both psychiatrists. When ideas were running low, each of them reached for a small notebook in his vest pocket, and from scribbled notes there was able to recall enough stories of the smoking room type to keep the gathering in an uproar throughout the rest of the meeting. Barring accidents, I believe that these two individuals will undergo much the same involutionary changes and suffer the same general type of diseases.

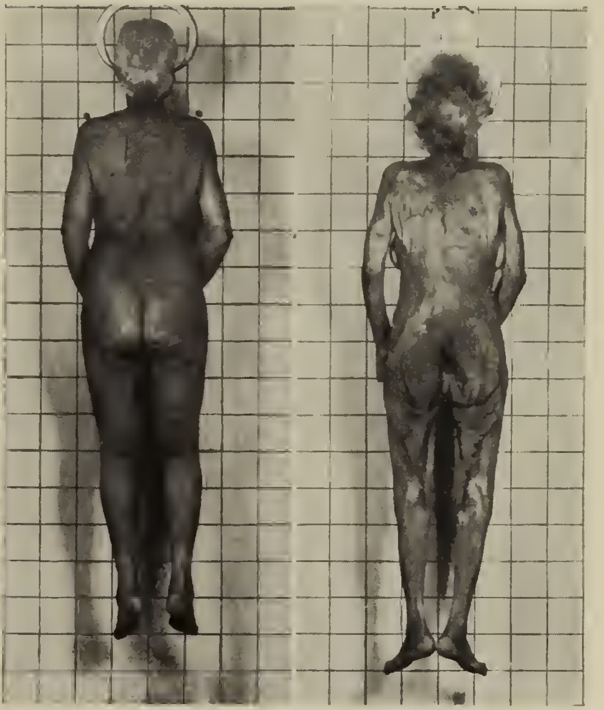


Cyclothymic
Age 55; weight 54 kg.; height 168 cm.
Cerebral hemorrhage

Schizoid
Age 59; weight 52 kg.; height 170 cm.
Lobar pneumonia

FIG. 3(a). "AVERAGE" MALE CYCLOTHYMIC COMPARED WITH "AVERAGE" MALE SCHIZOID AS REGARDS BODY FORM

The study of twins has been of enormous importance in the elucidation of genetic and constitutional factors and the superimposition of environmental deviations from without. Rosanoff, Lange and others have developed the "co-twin control" method of studying various disorders not only physical but also psychic. Identical twins, for example, are two different individuals but with a single genetic constitution. They look alike, think alike, behave alike, and suffer the same constitutional diseases. Extraordinary examples of epilepsy, mental deficiency, dementia praecox, manic-depressive psychsios and even criminality and tumors of the brain have been reported as affecting both of a pair of identical twins. Fraternal twins are as different physically, mentally and immunologically as are brothers, and they carry no more than the average family likelihood of suffering the same mental disorders.



Cyclothymic
Age 68; weight 58 kg.; height 157 cm.
Coronary thrombosis

Schizoid
Age 70; weight 42 kg.; height 154 cm.
Arteriosclerosis

FIG. 3(b). "AVERAGE" FEMALE CYCLOTHYMIC COMPARED WITH "AVERAGE" FEMALE SCHIZOID AS REGARDS BODY FORM

NOSOLOGIC STUDIES

Turning now to consideration of the personality reaction type with susceptibility and resistance to diseases of various categories it is necessary again to classify the disease types before pointing out the correlations. Tuberculosis and cancer were two disorders with such obvious constitutional peculiarities that they were at once set apart. Syphilis was chosen for a separate category chiefly on account of the large number of cases. Acute infectious diseases and violent deaths proved to be no respecters of constitutional types, and, therefore, served as valuable controls. Circulatory disasters, such as cerebral hemorrhage, coronary thrombosis, ruptured aneurism and the like were grouped together, and such diseases as might come under the term chronic streptococcus infections were also combined. In this latter group came arthritis, peptic ulcer, chronic glomerulonephritis, renal calculi, ulcerative colitis, and some cases of gallstones. Strangulated hernia, volvulus and intussusception were classed as intestinal catastrophes. Cases of diabetes, pernicious anemia, and frank endocrine disorders were too few for statistical purposes, while arteriosclerosis, senility and terminal pneumonia were not sufficiently characteristic to warrant special study.

Important correlations were found to exist between personality reaction type and susceptibility to certain disease groups. Tuberculosis, for instance, showed an overwhelming incidence in the schizoid group, while malignancy in all forms predominated in the paranoid group. Circulatory disasters and chronic streptococcus infections predominated in the cycloid and paranoid groups, very few of them appearing among the schizoid group. Intestinal catastrophes predominated in the schizoid group, while none at all were found in the cycloid group in spite of the fact that hernia was most frequent in this category. No instance of diabetes was encountered among the epileptoids, and malignancy was rare. On the other hand, persistent thymus and cerebral malformations were very frequent among the epileptics.

A discussion of these disease susceptibilities and immunities may throw some light upon the constitutional peculiarities found in mental disorders. As a general rule, the correlation between psychologic type and disease type runs higher than between body type and disease type, although my studies have brought out some interesting correlates in that particular field of study. It would lead too far afield to consider those studies now.

The psychologic-nosologic correlations, however, are decidedly to the point.

Tuberculosis. The incidence of active tuberculosis in the schizoid group is 317 per 1,000 in the autopsied cases, as against 20 per 1,000 in the paranoid group (Fig. 4). The regressive nature of the psychosis is apparently linked with a defective immunity against the disease. The figures do not lose in value when it is considered that many patients diagnosed dementia paralytica or senile psychosis but presenting dominant schizoid traits are included in this category.

Malignant Tumors. Malignant tumors predominate in individuals who, at the psychologic level, may be said to be compensatory or hypercompensatory, particularly in the paranoid and cycloid groups (Fig. 5). Lewis likes to compare the small group of cells proliferating in one portion of the economy and gradually destroying life, to the small group of ideas that proliferates in the mind without regard to neighboring elements and finally destroys judgment. The occurrence of malignant disease in the regressive types is low. Indeed, the epileptic individual appears to possess a high immunity to carcinoma. None of the patients presenting convulsions in the course of cerebral tumors seemed to be constitutional epileptics. Other authors testify to the rarity of malignant tumors among the epileptics.

Syphilis. While it may be taken for granted that exposure to tuberculous infection is almost universal, this is by no means the case with syphilis. Moreover, there is no very good evidence of constitutional immunity to syphilis. Hence, the chart is perhaps more of an indication of the type of individual who exposes himself to this disease (Fig. 6). The schizoid individual would appear to contract it somewhat less often

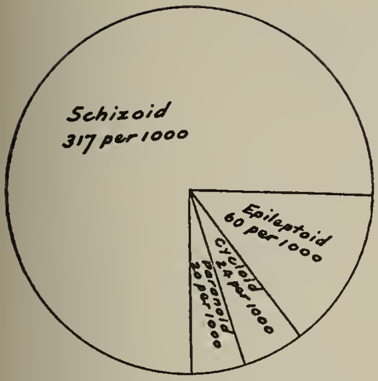


Fig. 4. Active Tuberculosis

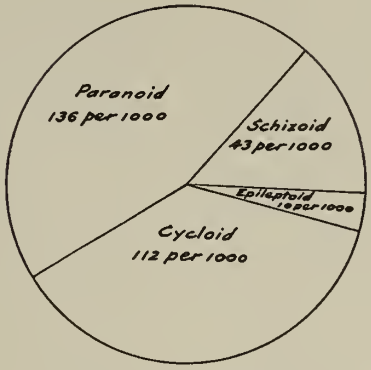


Fig. 5. Malignant Tumors

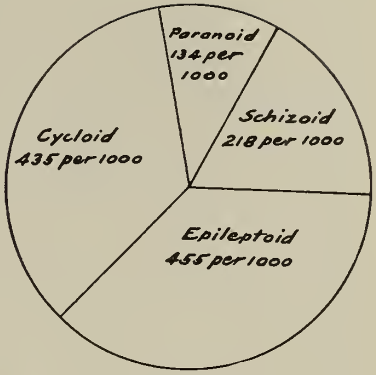


Fig. 6. Syphilis

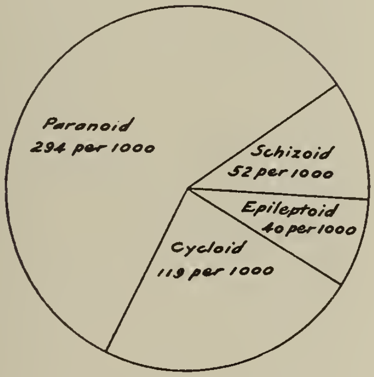


Fig. 7. Chronic Streptococcus Infections

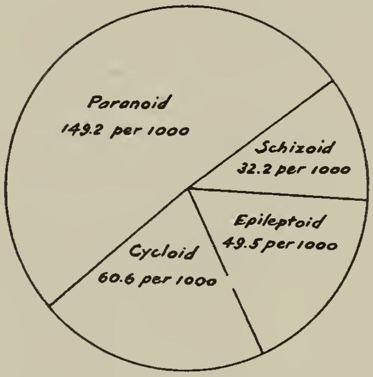


Fig. 8. Circulatory Disasters

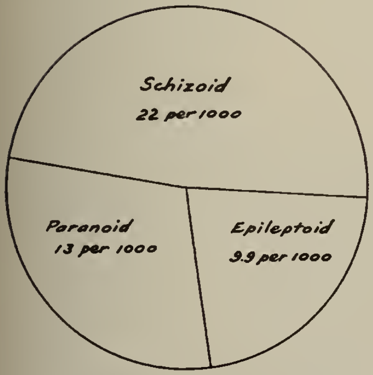


Fig. 9. Intestinal Catastrophes

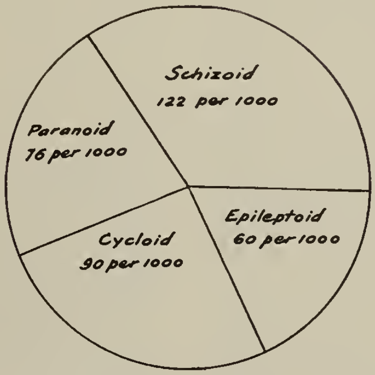


Fig. 10. Deaths Due to Acute Infections

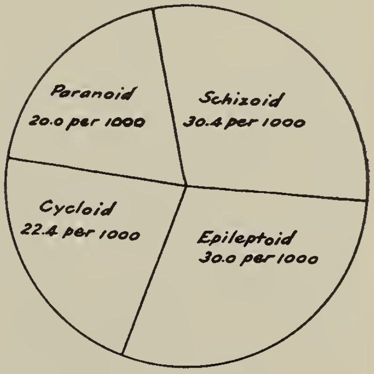


Fig. 11. Deaths by Violence

COMPARATIVE INCIDENCE, ACCORDING TO PERSONALITY TYPE than certain other individuals, perhaps on account of his self-centered, autistic nature. The low incidence in the paranoid group may be accounted for by the rather frequent aberrations in the sexual life of this type of individual. Impotence, homosexuality and diversion of interests to other fields as well as the suspicious character may account for the relatively small percentage of paranoid individuals suffering from syphilis. On the other hand, the extroverted cyclothymic individual, whose relations with the opposite sex are often promiscuous, makes up quite a proportion of the paralytic dements. The high rate for the epileptoid group is probably faulty, owing to the production of repeated convulsive seizures by the degenerative and inflammatory changes in the brain by the treponeme in individuals who otherwise would not have developed this particular form of reaction.

Chronic Streptococcus Infections. The incidence of chronic streptococcus infections is strikingly similar to that of malignant disease, being predominant in individuals of compensatory nature (Fig. 7). There are several factors that may explain this, an important one being age. Both malignant disease and productive inflammation are more prevalent in later years, and the paranoid individuals in general live about 12 years longer than the schizoid. To be strictly accurate, the equivalent age groups should be compared. The fact remains, however, that many schizoid individuals reach an advanced age. Youthful individuals presenting chronic streptococcus infections as well as those presenting carcinoma are almost invariably found in the cycloid and paranoid groups. Another factor that may influence the figures and even be of primary significance, although difficult of actual demonstration, is the reaction of the individual to the local infection. It is a matter of common experience that teeth and gums may be seriously diseased with copious discharge of pus and destruction of bone, without causing more than mild local inconvenience to the patient. On the other hand, teeth that appear healthy on inspection may have at their roots localized collections of devitalized tissue containing organisms that occasion the most serious systemic disorders. It may be argued that in the former case the connective tissue defenses of the body are insufficient to cope with the infection, which, therefore, breaks down the tissue and evacuates itself, and that in the latter case, where teeth and gums appear healthy yet harbor foci of infection, the proliferating fibroblasts wall in the invading organisms not only preventing satisfactory drainage through an external opening, but even shielding them from the circulating immune bodies. Under such circumstances, compensatory activity on the part of the connective tissue is as harmful in one way to one individual as it is beneficial to another infected, say, with tuberculosis. The reaction of the individual to the systemic infection is a third possible factor. It may be, in view of the overproduction of fibrous tissue in the paranoid individual, that greater anatomical deviations are produced than occur in an individual of different make-up. In the regressive person, granted that the infection is not sufficiently severe to cause death, the process of resolution and resorption might remove the evidence of previous infection to such a degree that at the time of necropsy it would make little impression upon the pathologist. Whatever the explanation, it is apparent that chronic streptococcus infections are most prominent in paranoid and cycloid individuals than in others, so much so as to suggest a biologic relationship

Circulatory Disasters. In this group of affections the person who is prone to abnormally great activity of both body and mind is more susceptible. The high incidence among paranoid patients suggests the presence of a perverse biologic reaction (Fig. 8). Were mere activity of body and mind responsible one would expect to see a high incidence among the cyclothymics. The difference between the external reactions of the two types seems to lie in the manner in which each type handles its frustrations. The cycloid individual is better able to discharge his affect, to blow off steam, to get his rage out of his system by immediate physical activity, whereas the paranoid individual often restrains an immediate outburst, represses his wrath, harbors his grudge, and turns his affect inward.

I knew of two brothers, once, who demonstrated in a striking manner the bad effects upon society of the immediate reaction, on the one hand, and on the other hand the bad effects upon the individual of repression. One man was a rather typical psychopath who was always getting himself into scrapes, lying, stealing, fighting and drinking. Once he even threatened his brother with a pistol. The brother was ambitious, resentful, restrained. This was the one that suffered from repeated gastric hemorrhages, perforating ulcer, and hypertension while still in his thirties. So far as these individuals were concerned, it seemed more healthy to break man's laws than nature's.

Intestinal Catastrophes. The predominance of schizoid individuals in this category might be supposed to be due to the prevalence of the asthenic build with its long mesentery and relaxed abdominal walls and inguinal rings. This proved to be not at all the case, since the athletic type of build occurred in two thirds of the cases, and the asthenic build not at all. Swallowed foreign bodies accounted for some of these cases, but the recent work of Watts upon disorders of gastro-intestinal motility associated with disease of the brain suggests that a central derangement of intestinal motility may be responsible for such disorders as intussusception, volvulus and some cases of strangulated hernia (Fig. 9).

Acute infectious diseases (Fig. 10) and deaths by violence (Fig. 11) showed the least predilection for one type or another of psychologic reaction, and thus became a rather striking control observation, emphasizing the constitutional peculiarities associated with the disease groups considered in this section.

The conclusion reached from this study is that an appreciation of the personality reaction type might be a guide to the nature of the physical disorders suffered by the individual. External influences impinge upon the individual and he reacts to them in a manner determined by his organismic pattern. If he reacts in a particular manner to a psychologic insult, he will react in an analogous manner to a bacterial or to a chemical insult. If he "lies down" when his boss upbraids him he is apt to lie down under the assault of the tubercle bacillus, both figuratively and literally. If he jokes about severe financial losses, he is apt to stand up well under severe hemorrhage or severe diarrhea. It is a question of "backbone." If he responds to a blow on the jaw by pinning his opponent's shoulders to the floor, his endothelial leukocytes may react to the insults of invading streptococci by pinning them into a periapical focus in the same jaw. If he reacts to his discharge from a job by building up a series of delusions that destroys his insight, he may also respond to physical injury by building up a new growth that destroys his life. "Cancer," says Lewis, "is paranoia at the cellular level."

(To be continued)

Meningiomas of the Posterior Fossa. A Report of Four Cases.—Meningiomas of the posterior fossa, although relatively rare, have in my experience been among the most difficult to diagnose because of their bizarre symptomatology. Owing to their slow growth the cerebellar lobes apparently adapt themselves to the encroachment of these tumors and the ataxia, which is so prominently identified with the invasive gliomas of the cerebellum, is much less in evidence, if at all, in the more circumscribed meningiomas.

I am reporting 4 cases of meningioma of the posterior fossa. It will be seen that each case presents a problem in itself and does not readily fit into a definite diagnostic pattern. The first case, I believe, is unique in that it is the only one I have been able to find either in the literature or on inquiry among my neurosurgical colleagues where a meningioma and multiple abscesses occurring in the same patient were successfully operated upon.

Report of Cases

Case 1: *Meningioma associated with multiple brain abscesses. Removal of tumor. Drainage of abscesses. Recovery for 3 years. . . .*

Case 2: *Meningioma of the posterior fossa projecting into the foramen magnum. Removal of cerebellar and intraspinal tumor with improvement. Recurrence. Autopsy. . . .*

Comment.—In this case we were dealing with what must have been a fairly benign tumor at its onset 9 years before death. Each succeeding specimen removed apparently was more malignant in spite of removal or roentgen therapy. Although the tumor had reached a fairly large size in the posterior fossa, its nature did not become clear until it invaded the foramen, wedging the cord and giving unmistakable signs of a transverse myelitis.

Case 3: *Headache and vomiting of 5 days' duration. Coma. Death. Meningioma of the posterior fossa revealed at autopsy. . . .*

Case 4: *Meningioma of the left posterior fossa. History of numerous head injuries. Sudden coma. Remission of symptoms. Removal of tumor. Recovery. . . .*

Comment.—In all four cases presented, ataxia, although present at times from the history, was not a definite finding on neurological examination. This is, I believe, a distinguishing point between the posterior fossa meningiomas and the cerebellar gliomas, with their more constant finding of ataxia.

Summary. 1. A report of 4 cases of meningioma of the posterior fossa is given showing great variation in symptomatology and findings.

2. An unusual case of meningioma associated with multiple brain abscess is presented.

3. The significance of the *history* of recurrent ataxia in these cases in the absence of neurological findings is emphasized.

Extract from article by Frederic Schreiber, M.D., Detroit, Michigan, *The Journal, Michigan State Medical Society*, September, 1936, p. 557.

TRAUMATIC EPILEPSY WITH CORTICAL SCAR*†

DIAGNOSIS AND RESULTS OF OPERATION IN TWENTY CASES

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Philadelphia
and
James W. Watts, M.D.
Associate Professor of Neurosurgery, George Washington University School of Medicine

Although most epileptics attribute their attacks to a previous head injury, it is only recently that this group of true traumatic epilepsy has become clearly defined. In 1930 patients having an actual cerebral cicatrix or cortical scar were presented by Foerster and Penfield.

Firm adhesions are present between the damaged brain tissue and one or more of the overlying structures—arachnoid, dura, bone, periosteum and scalp. Microscopically the scar is made up of fibrous astrocytes and of fibrous tissue which enters with the extracerebral blood supply from the meninges and scalp. The scar often extends into the brain as deep as the lateral ventricle. Presumably as the scar contracts it causes periodic traction on the blood vessels which interferes with the blood supply to the cortex. The work of Foerster and Penfield has demonstrated that excision of the traumatized area produces a fluid-filled space with a very small amount of gliosis, without a plexus of new-formed vessels, without cicatricial pull on the surrounding brain, and with reduction or elimination of the convulsive attacks.

In this paper we have reviewed a series of 20 such patients operated upon at the Hospital of the University of Pennsylvania, directing particular attention to the diagnosis and the results of operation.

Diagnosis

Five features of the diagnosis deserve emphasis (Table 1):

1. All of the patients had received severe head injuries prior to the onset of epilepsy. There was loss of consciousness for many hours and often for many days. Emergency operations for elevation of depressed fractures and débridement had been performed in several instances. Bone defects obvious both from clinical and X-ray examination were present in 65 per cent of the patients (Fig. 1). Laceration of the dura was found at operation in 35 per cent.

2. Focal features of the convulsive seizures were observed in 60 per cent of the patients.

3. Neurological signs indicative of focal cerebral damage were present in 85 per cent. These varied from slight defects in the visual fields to partial hemiparesis.

TABLE 1
Diagnosis of Cortical Scar

CRANIAL DEFECT	DURAL DEFECT	FOCAL FEATURES OF ATTACKS	FOCAL NEUROLOGICAL CHANGES	POSITIVE ENCEPHALOGRAM*
13 65%	7 35%	12 60%	17 85%	13 86%

* Encephalogram performed in only 15 of the 20 cases.

4. Encephalograms were of great diagnostic aid but were not infallible. Of the 15 patients in whom encephalograms were made, findings indicative of cerebral cicatrix were present in 13. The changes usually found were a dilatation of the ipsolateral ventricle, shift of the ventricular system toward the site of the scar, and an absence of cortical markings over the surface of the brain in the region of the lesion (Fig. 2). In 2 instances the encephalograms were normal although definite scars were found at operation. It might be added that in another case not included in this series, changes suggestive of a

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* Read before the joint meeting of the Section on Neurology and Psychiatry and the Society, April 15, 1936.

† From the Neurosurgical Service of the Hospital of the University of Pennsylvania, Philadelphia, Pa.

cortical scar were present, but no cicatrix was found at operation.

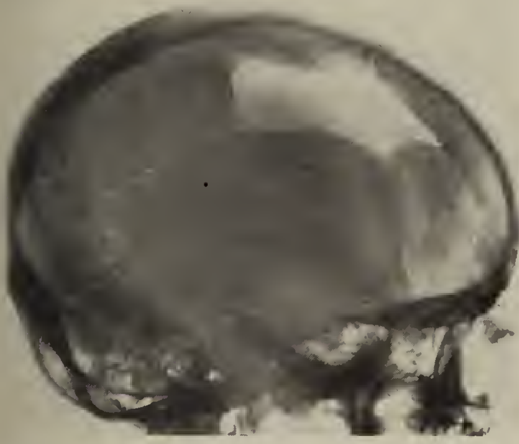

Fig. 1. Defect in Skull Following Débridement and Removal of Depressed Fragments of Bone

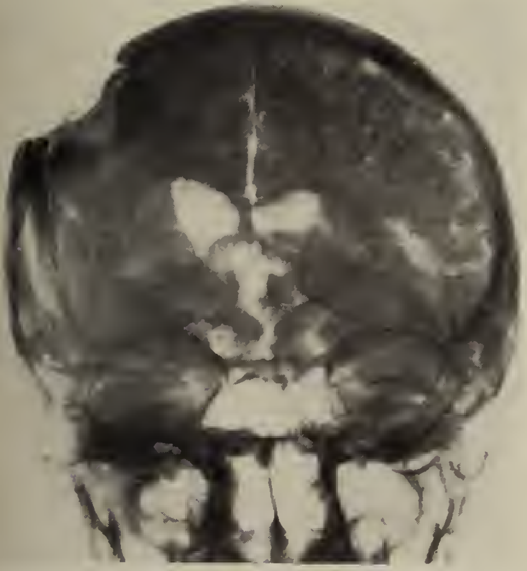

Fig. 2. Encephalogram Illustrating Dilatation of the Ipsolateral Ventricle, Shift of the Ventricular System toward the Site of the Scar, and an Absence of Cortical Markings Over the Surface of the Brain in the Region of the Lesion

5. The long interval which elapses between the injury and the onset of convulsive attacks has important social aspects. There was an interval of 14 years in 2 of our patients between the injury and the first convulsion; of 13 years in 1 patient and of 12 years in another. The shortest period between injury and the first attack was 3 months and the next shortest was 7 months.

In Symonds' series of traumatic epileptics due to head injuries of the "closed" variety whose cases involved compensation, 75 per cent had accepted final settlements before the first fit occurred. The following quotation is taken from Symonds' article: "Most of them had recovered from the first effects of the accident and had returned to work and had been content to accept a small lump sum. Subsequently they were disabled without hope of further recompense. In any case of adequate head injury the risk of traumatic epilepsy must be remembered and allowed for. Under the Workmen's Compensation Act there is an excellent provision whereby the injured person may accept a lump sum settlement on condition that if a specified complication should arise later the question of compensation may be reopened. This provision should, in my opinion, be utilized against the risk of traumatic epilepsy much more often than it is at the present."

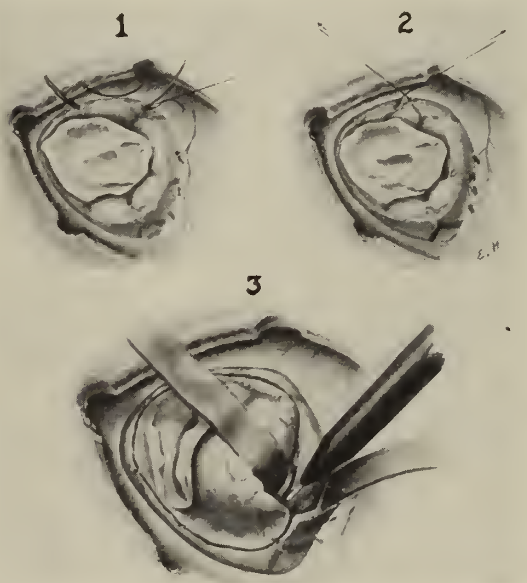

Fig. 3. Drawings Illustrating Technic of Excision of Cortical Scar (Steps 1, 2 and 3)

SURGICAL TECHNIC

The drawings in Figure 3 illustrate the surgical technic used in excision of the cicatrix.

Sutures are passed deep into the brain peripheral to the margins of the scar. Tying the suture cuts through the cerebral tissue and secures hemostasis of the blood vessels in the piarachnoid. After the sutures have been tied, the scar is removed chiefly by blunt dissection. Vessels below the surface of the cortex are coagulated with the electrocautery. The excision should go deep enough to remove all scar tissue, carrying it into the ventricle when necessary.

Hemostasis requires even greater attention in traumatic epilepsy than in the case of intracranial tumors because there is no increase in intracranial pressure to stop venous oozing. Phenobarbital should be given at regular intervals beginning immediately after the operation, since a convulsive attack within the first 24 hours may initiate a postoperative hemorrhage.

TABLE 2

RESULTS OF OPERATION

GROUP	NUMBER OF CASES	PER CENT OF SERIES	AVERAGE FOLLOW-UP
I. Slight or no improvement....	7	35	2 years and 1 month
II. Marked improvement....	10	50	2 years
III. Complete relief of attacks.....	3	15	2 years and 3 months

RESULTS OF OPERATION

The results of excision of cortical scar may be considered in 3 groups and are outlined in Table 2. Thirty-five per cent of the patients obtained only slight or temporary improvement or were unimproved. In general, these were patients who had the most extensive cerebral damage and who had convulsions of longest duration before operation. Marked improvement occurred in 50 per cent in the series. Many were free from attacks for 6 months or more only to have convulsions recur, but at infrequent intervals. Two patients in Group II have had only 1 attack. After a period of nearly 3 years of freedom from seizures 1 patient had a convulsion the morning after a party at which he drank 20 bottles of beer. After having a number of milder convulsive attacks in the early months following operation, 2 patients have been free for over 6 months. Fifteen per cent in the series (Group III) have been completely relieved of traumatic epilepsy. The average follow-up period is 2 years and 3 months, and 1 patient has been free from attacks over 5 years.

To present more clearly and more concretely the problems of diagnosis and treatment of traumatic epilepsy with cortical scar, 1 case is presented—not the best in the series as regards result, but certainly not the worst.

REPORT OF ILLUSTRATIVE CASE

Case 1: N. K., a white male, aged 23 years, surgical file No. 29995. On June 29, 1933, while walking along a highway the patient was struck on the head by some heavy object projecting from a passing truck. He was unconscious for 2 weeks, in spite of an immediate débridement of a severe right frontal depressed fracture. He showed a complete left hemiplegia for about the same length of time, and was able to return to work only after 5 months. On February 2, 1934, he had a generalized convulsion preceded by paresthesias in the left hand. In the succeeding 10 months he had a total of 4 attacks. On examination the patient showed a large right frontoparietal bone defect (Fig. 1); a weakness of the left lower face and hand, left-sided astereognosis, and impairment of the sense of position and motion in the left hand. An encephalogram showed the characteristic findings of the ipsolateral ventricular dilatation, a shift of the ventricles to the right and a lack of the right frontoparietal cortical markings (Fig. 2). On October 27, 1934, a right frontoparietal cranioplasty was carried out. After several months this appeared to have healed well, and on March 22, 1935, the scar was exposed and excised down to and into the right lateral ventricle. After operation the patient had a marked weakness of the left side which has steadily improved until now there is difficulty in using the left hand only. During the 13 months that have elapsed since operation there has been 1 generalized convulsive seizure.

SUMMARY AND CONCLUSIONS

1. A study of traumatic epilepsy with cortical scar in 20 cases indicates that the diagnosis depends largely upon the history of severe head injury, focal features of the attacks, neurological signs of local injury to the brain, and characteristic findings in encephalograms.

2. Attention is called to the interval of years which often elapses between the craniocerebral trauma and the onset of the first convulsive attack; and its relation to compensation is commented upon.

3. Following surgical extirpation of the cicatrix 15 per cent in our series were entirely relieved of attacks, and an additional 50 per cent showed marked improvement.

4. While the operation of removal of cortical scar cannot be regarded as a panacea for traumatic epilepsy, the fact that 65 per cent of the patients in this series were definitely benefited seems to justify the use of the procedure in attacking what is otherwise a hopeless condition.

BIBLIOGRAPHY

Foerster, O., and Penfield, W.: The Structural Basis of Traumatic Epilepsy and Results of Radical Operation. Brain, 1930, 53, 99.

Symonds, C. P.: Traumatic Epilepsy. Lancet, 1935, 2, 1,217.

NEW YORK CITY PLANS FOR COMBATING SYPHILIS*

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Aside from the action of favorable or unfavorable natural forces, the possibilities of reducing the prevalence of a communicable disease depend upon our knowledge of the disease, and on the administrative practicability of measures for applying our knowledge effectively. As Herman Biggs said, "within natural limitations a community can determine its own death rate." Syphilis is a communicable disease which ranks high as a cause of disability and death. Do we know enough about syphilis ever to eradicate it? If so, can our knowledge be applied practically? I believe the answer to both of these questions is in the affirmative.

As a matter of fact, we know as much about syphilis as we know about any communicable disease including its etiology, pathology, course, diagnosis, treatment and prognosis. Especially, we know how to render syphilis non-infectious and how to keep it so. If every case of early syphilis, or even a large majority of such cases, were found and given 20 doses of arsphenamine and 40 doses of bismuth or mercury by the continuous method of treatment, the end of this disease would be in sight.

Each week nearly a thousand newly diagnosed cases of syphilis are reported to the New York City Department of Health, over 50,000 per year, but this is only a small part of the vast number in our population. If the prevalence rate of syphilis in New York City is as high as that of the United States as a whole, we must assume that there are in New York City about 378,000 cases—in other words about 5 per cent of the population. If we spend as much per capita for the medical and custodial care of cases of syphilis as St. Louis spends, we must pay out each year about $17,000,000.00 for these purposes. At present our best hope of eventual conquest of syphilis and of relief from the burden of its care appears to lie in the fact that syphilis can be rendered non-infectious by treatment. This is the foundation upon which has been built the success that has thus far been attained —success that is brilliant though limited to but a few small countries. In Denmark, a country having about half the population of New York City, syphilis has been reduced from about 700 per 100,000 in 1885 to 35 per 100,000 in 1935. Syphilis is about as uncommon in Copenhagen as typhoid fever is in New York City. In Sweden the highest prevalence rate recorded was in 1919 when an explosive epidemic carried the rate to about 600 per 100,000. In 1934 it has fallen to 43. Great Britain has apparently reduced the number of cases of syphilis by one half since 1920, the highest point. In each of these countries the essential factor in achieving success appears to have been the treatment of infectious cases to render them non-infectious.

We have in New York City almost 14,000 licensed practitioners of medicine. I maintain that these physicians constitute the shock troops in our battle against syphilis, more valuable than all the many clinics and hospitals, voluntary and official, in the city. Private practitioners, collectively, see or have the opportunity to see more cases of syphilis than all the institutions combined, for these cases, many of them unaware of luetic infection, are visiting general practitioners and specialists for every malady to which the flesh is heir. More general use of modern diagnostic procedures, and a "lower threshold of suspicion" of syphilis would lead to the discovery of many thousand more cases of syphilis and to the treatment of these cases, to the enormous benefit of the public health and the profit of the profession.

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* Read before the Annual Scientific Assembly of the Society, May 6, 1936.

IMMEDIATE OBJECTIVE

The immediate objective of the New York City Department of Health is to aid private physicians in discovering, treating and controlling syphilis among patients who go to private practitioners. The practical aids which the Department of Health proposes to offer may be briefly described as follows:

First—Diagnostic Services. The Department of Health laboratory performs serologic tests for syphilis without charge (215,000 specimens were tested last year). At every one of the 14 diagnostic centers blood specimens are taken for private physicians on request. Expert dark-field examinations and diagnostic consultations are offered in these centers, the reports being sent directly to the physicians. These diagnostic aids are available for all classes of syphilis, and physicians are invited to use this service freely without fear of losing their patients.

Second—Treatment Services. In order to enable private physicians to care for a larger number of patients having syphilis, especially that large body of individuals who cannot pay the full regular fee, the Department of Health plans as soon as possible to provide neoarsphenamine, bismuth or mercury in amounts sufficient for 1 year of the treatment in accordance with modern therapeutic methods. These drugs should be supplied free upon request without distinction as to the patient's ability to pay the physician a full fee or any fee for his service. This would enable private physicians to give medical care to many patients who can pay only a small fee—fees comparable with those charged by many so-called "pay clinics." Judging from the numerous requests received by the Department of Health there are many physicians who would be happy to treat certain patients free of charge if the necessary drugs were supplied. Because the funds when available for this purpose are expected for the present to be limited, drugs will be provided to private practitioners only for the treatment of early syphilis, syphilis in pregnancy, and congenital syphilis. Later it is hoped that the same assistance may be extended to all cases of syphilis found under private medical care. Physicians willing to coöperate with the Department of Health in the diagnosis and treatment of syphilis will be asked to report their cases at the time of requesting drugs, if they have not already done so, and supplies will be furnished in 4 allotments, each sufficient for 3 months of continuous modern treatment. Every effort will be made to supply the drugs of the physician's preference and by a system convenient for the practitioner. It should be understood that the Department of Health does not plan to require the physician to state that his luetic patient is indigent or unable to pay a fee for medical service, nor will the Department suggest any schedule of fees which the physician should charge if he uses drugs furnished by the Department. It is anticipated, however, that when a patient is able to pay the full specialist fee for medical care, the physician will not wish to administer drugs obtained at public expense.

Upon request, the services of especially selected and trained nurses will be made available to follow up lapsed cases reported by physicians, the nurse for the time being working under the direction of the physician reporting the lapsed case. This is an important feature of the plan since by sufficiently sustained treatment syphilis may be rendered permanently non-infectious and in many cases a clinical cure may be achieved.

Third—Epidemiological Service. After a case of syphilis has been brought under treatment, the next most important duty is to answer the question, "From whom did the patient acquire the disease and to whom may he or she have transmitted it?" This in substance is the epidemiology of syphilis. In early syphilis, syphilis in pregnancy, and congenital syphilis, we have our best opportunity for epidemiologic work, and many physicians in their daily practice are doing excellent case-finding work with patients of these types. The Department of Health as soon as possible will offer its services to aid the physician in finding the source of infection of the patient having early syphilis, syphilis complicating pregnancy or congenital syphilis. For this service a group of physicians will be employed and specially trained. The Department will make their services available to physicians requesting drugs and to any other physician who wishes the coöperation of the epidemiologist in finding sources of infection and in bringing them under treatment, but in no case will action be taken without the approval of the physician with whom we are coöperating. Where this plan has been in operation about 25 per cent of the sources of infection have been brought under medical care, through the coöperation of the private physician and the epidemiologist.

Fourth—Educational Activities. The Sanitary Code requires that every person found by a physician to have syphilis or gonorrhea shall be given a pamphlet of instruction with regard to his infection and the protection of contacts. The Department of Health furnishes this pamphlet to physicians and clinics. New editions in appropriate foreign languages are being prepared. The Department also coöperates in making postgraduate instruction available to physicians, bringing to their attention the most accepted modern ideas and methods of diagnosis and treatment of syphilis.

Fifth—The Reporting of Syphilis. In reporting a case of syphilis or gonorrhea or other communicable disease to the Department of Health a physician renders a valuable public service. It would be appropriate in New York City as in Great Britain to compensate the physician for this report, and if funds were available, I should be glad to see this done. The least that the Department of Health can do, it seems to me, is to make reporting convenient and free even of the cost of postage. As soon as possible it would be desirable to provide a more convenient form for reporting, and to pay the postage upon receipt of the report. All the physicians will have to do then is to fill in the facts, slip the form into an envelope provided by the Department of Health and deposit it in the post box. (Reporting by initials and address is permissible, and I wish to emphasize that all reports are strictly confidential, and are kept under lock at the Department of Health.) Direct reporting by a physician is of great service to the Department and will be of greater service as our plans get under way, for this source of information will be taken into account in judging the progress of our fight against syphilis.

The plans discussed above are subject to modifications as the need and recommendation of physicians may indicate. We hope that these measures will help to remove the economic barriers that stand in the way of many patients who might be given medical care by private practitioners. These measures should enable private physicians to participate more fully in the attack on syphilis and bring them to the front as auxiliary health officers.

Coöperation with the Volunteer Hospitals

The 50 clinics of voluntary hospitals in New York City should play a more important part in the fight against syphilis. It is proposed to aid these clinics to increase the number of indigent patients to whom they give medical care gratuitously. Many of these clinics would be willing and able to provide treatment without charge for a larger number of poverty-stricken patients if drugs were supplied by the Department of Health. To clinics which charge only low fees—fees that cannot possibly compete with those of private physicians, it is desirable that the Department of Health should provide drugs to enable them to care for indigent luetic patients. In this manner, facilities are increased and brought closer to those who need them. The Sanitary Code regulates the conduct of these clinics and requires the maintenance of certain standards including adequate personnel for the follow-up of cases. After clinics have exhausted their resources in endeavoring to return lapsed infectious cases to treatment or to bring sources of infection under control, the Department of Health now employs its legal authority to seek out such uncoöperative individuals and bring them under medical care. Whenever such cases are reported to the Department of Health, whether by clinics or physicians, appropriate action is taken.

RÔLE OF THE CITY HOSPITALS

The provision of treatment for syphilis in indigents and others who cannot pay, whether this treatment be ambulatory or in-patient, is primarily the function of the various tax-supported hospitals of the city. In spite of the best efforts of the Department of Hospitals and although splendid progress has been made in 1936, the facilities are still very far short of the needs of the city, especially in respect of bed accommodations. The greatest single need in New York City, it is believed, is more bed accommodation for infectious cases of syphilis and gonorrhea, whether they be voluntary admissions or legally removed by the order of the Health Department. In the New York City fight against syphilis, scarcely any more important development has occurred than the provision of funds for the payment of physicians rendering medical services in the syphilis and gonorrhea clinics of the city's hospitals. This will result, it is believed, in much more and much better service for the infected poor.

The relation of the health authority to the city hospital clinics is defined by the provisions of the state law and of the Sanitary Code. They provide for the follow-up by the Department of Health of lapsed infectious cases and sources of infection and give the Department power to require examination and treatment if indicated. Certain city hospitals receive, and give medical care to infectious cases of syphilis and gonorrhea removed to them by the authority of the Health Department. Neither the private physician nor the hospital, whether voluntary or official, has the authority to detain forcibly a case of infectious syphilis or gonorrhea. But by bringing such a case to the attention of the Department of Health appropriate action can be and is promptly taken for the full protection of the public health, and such cases are received by a city hospital designated by the Board of Health. More use should be made of this authority vested in the Department of Health, but more bed accommodations are needed before the laws can be used to the fullest extent for these quarantine procedures.

FUNCTION OF THE DEPARTMENT OF HEALTH

We come at last to the Department of Health. Much of the work and the plans of the Department have been already described. The Department has primarily the duty of promoting, directing and aiding the attack on syphilis as a communicable disease. As a matter of sound policy it may work through other agencies, both official and voluntary, to gain its ends. It must supply deficiencies. Thus, for the present it is obliged to supply a part of the treatment facilities for the very poor, and it now maintains 7 treatment centers, all of which are crowded to capacity with the unemployed and other very poor, infected persons. Still more treatment facilities are badly needed, but it is hoped that the larger participation of private physicians, voluntary hospitals, and the increased services of the Department of Hospitals will largely meet this need. And when the Department of Health can properly close its treatment clinics it will do so, believing that treatment can eventually best be carried out in and by the city's hospitals.

No permanent service of the Department of Health is more important than that of instruction of the public with regard to syphilis. This in the future will be done to a larger extent and by better methods than in the past. Diagnostic services and consultations are believed to be permanent case-finding functions, so long as syphilis remains a major health problem. At present there are 14 centers for these services.

The epidemiology of syphilis is a permanent obligation, and the epidemiological service should be rapidly developed, since by finding and treating the infectious cases, syphilis can be brought under control.

The hope of success in combating syphilis, in reducing its prevalence and mortality rates lies in full understanding and coöperation between all who are responsible for any phase of the program. We cannot transport to America any European plan, successful as it may have been abroad. We must draw up our own blue-prints and build our own public health structure. Useful suggestions come from a study of the Swedish Plan and equally the Danish Plan. They clearly indicate to us the fundamental, scientific principles on which their success has been based. But what we need for New York, we contend, is a New York Plan—one that is based on the essential medical data, but nicely adapted to our particular social and medical institutions and conditions.

RECOMMENDATIONS OF THE NEW YORK ACADEMY OF MEDICINE

It may be appropriate here to quote the unanimous recommendations of a special committee of the New York Academy of Medicine which considered the problems of syphilis and gonorrhea and issued a report on that subject. The "summary of essentials of community control" adopted by this distinguished committee suggested that the following are necessary:

"1. Public health education.

2. Availability of treatment for all infected persons, including an adequate number of hospital beds for patients requiring such facilities.

3. Instruction of general practitioners in approved modern methods of diagnosis, treatment and follow-up.

4. Free diagnostic services for physicians so as to facilitate prompt and early recognition of disease.

5. Distribution under suitable control of free arsenicals to private physicians for the treatment of persons unable to pay a full fee.

6. Encouragement of reporting by private physicians of all new cases of venereal disease by exact initials and date of birth of patient, to improve accuracy of registration.

7. Coöperation of the public health authorities with private physicians, municipal and voluntary hospitals, outpatient departments and other clinics, so as to enable them to keep patients under control until cured and to bring the source of infection under treatment.

8. Assignment of public health nurses to clinics and, upon request, to private physicians for follow-up of delinquent patients and of contacts, and for distribution of health information to infected persons.

9. Setting up of standards for venereal disease clinics by the Department of Health, in coöperation with proper medical committees.

10. Requirement of routine tests for syphilis in the venereal disease clinics.

11. Provision for the detection and treatment of prenatal syphilis.

12. Regulation and supervision of treatment and follow-up of prostitutes and vagrants legally detained in hospitals, prisons and reformatories or paroled for treatment to clinics or to private physicians."

The plans of the New York City Department of Health are in harmony with these suggestions.

Without expecting miracles, but anticipating that the changes will be indicated as we progress, we believe that a start in the right direction has been made, and that, with the coöperation of our colleagues in private practice and in hospitals, we will, if we persevere, see a radical reduction in the prevalence of syphilis and in the disasters which it causes.

TUBERCULOSIS OF THE LARYNX*

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Incidence

Tuberculosis of the larynx is a common and a very serious complication of pulmonary tuberculosis. As one author has said, "the presence of tuberculous lesions of the larynx darkens the picture in pulmonary tuberculosis." The picture is darkened because tuberculosis involving the larynx is as a general rule an indication of active progressive tuberculosis of the lungs; it is darkened because it is an indication of a lowered resistance to the further invasion of the tubercle bacillus, and further, because it is a complication very distressing to the patient, depriving him in many cases of the all important benefits of rest and proper nourishment. One authority has stated that after an equal lapse of years 2 out of 3 patients with tuberculous laryngitis will be dead, whereas 2 out of 3 patients without this complication will be alive. Another authority has given these figures: Out of 477 patients 70.5 per cent with tuberculosis of the larynx were dead in a few years; 37.5 per cent without tuberculosis of the larynx were dead in the same period.

That the condition is one requiring the conscientious care and attention of both the laryngologist and internist cannot be denied, and we are beginning now to realize that a more hopeful and optimistic attitude toward this disease can be assumed.

Forty years ago Morell McKenzie said "It is not certain that any case of tuberculosis of the larynx has ever recovered." We now know that he was wrong, or rather we know that many cases of laryngeal tuberculosis recover and that its presence does not necessarily "seal the doom" of tuberculous patients.

Physicians not actively engaged in the care of tuberculosis do not, as a rule, appreciate the prevalence of this complication. Various figures have been given as to the frequency of tuberculous laryngitis. The statistics range anywhere from 3 to 85 per cent. One authority reports this complication as present in 15 per cent of early cases of pulmonary tuberculosis, 26 per cent in moderately advanced cases and 45 per cent in terminal cases.

When I was on duty at Fitzsimmons General Hospital, a large hospital devoted primarily to the care of tuberculosis, I gathered the following statistics. In 2 wards where the terminal or the most advanced cases were treated, 25 per cent showed active tuberculous lesions of the larynx. In 2 other wards where the patients had advanced active tuberculosis the figures were 16 and 15 per cent.

Of 798 autopsies on patients who died of pulmonary tuberculosis at Fitzsimmons General Hospital from November, 1920, to April, 1931, 226 cases, or 28.3 per cent, had demonstrable tuberculous involvement of the larynx. So I think we can deduce from these figures that approximately 25 per cent of persons with advanced active pulmonary tuberculosis have laryngeal involvement.

Methods of Invasion

It is generally recognized that tuberculosis of the larynx is not a primary clinical entity but is always secondary to pulmonary tuberculosis. It is also generally believed that it is a surface infection; that is, the infection takes place through the epithelium from secretion coughed up from the lungs. There are several important factors favoring this infection. One is the stagnation of the pulmonary secretion over the laryngeal tissues, a second is the pathological changes in the mucous membrane from pyogenic organisms and a third is the traumatism incident to coughing. It is possible that some cases are infected through the vascular and lymphatic channels, since we sometimes see patients with extensive laryngeal lesions without a positive sputum. It may be stated conversely that in many cases the larynx is not infected when the sputum is profuse and laden with tubercle bacilli. However, practically all patients have at some time or other tubercle bacilli in their sputum.

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* Read before the Section on Ophthalmology and Otolaryngology of the Society, April 17, 1936.

PATHOLOGY

As to the morbid anatomy we see the usual tuberculous lesions of edema, infiltration, tumor formation, perichondritis and ulceration. Tuberculosis of the larynx begins usually as an exudative and edematous process, and ulceration is usually present in the chronic and long-standing cases. Much has been written about early objective signs or pretuberculous lesions. Anemia of the mucosa and in other cases a hyperemia of the mucosa have been regarded by some as evidence of early tuberculous involvement. I, personally, do not believe these appearances are evidence of tuberculous invasion of the larynx but rather the usual accompaniment of the pulmonary condition—in one case of the general anemia of the patient, and in the other case of the hyperemia due to the purulent secretion from the lungs and to the traumatism from cough.

Generally speaking, the posterior part of the larynx is most commonly affected and it is here that we look for the earliest signs of disease. Often the first evidence of involvement is a smooth, edematous swelling of the arytenoids usually bilateral but frequently unilateral. Sometimes tubercles are visible on the mucosa of the arytenoids. The edema and swelling of the arytenoids and interarytenoid space are extreme, sometimes to the extent of almost closing the opening into the larynx.

An early lesion is a thickening of the mucosa of the interarytenoid space, which may present a papillomatous appearance.

In the epiglottis the first change is unilateral thickening on or near the free margin. Often a not sharply outlined red spot is present. Later the whole epiglottis may become greatly thickened and deformed; ulceration often occurs and the entire epiglottis may be destroyed.

On the vocal cords the first sign of tuberculosis is usually a more or less discrete red, swollen area not unlike a papilloma. Later, the cord or cords may show considerable infiltration and ulceration; vocal cords with irregular margins are not uncommon both in the active and inactive disease. Sometimes there may be fixation of the cords from arthritis of the crico-arytenoid joint.

In the far-advanced cases we frequently see extreme edema or ulceration and definite involvement of all visible parts of the larynx.

SYMPTOMS

Early subjective signs of disease of tuberculosis of the larynx often precede extensive laryngeal involvement. The tuberculous patient may complain of a slight hoarseness or huskiness of the voice, of a stinging, pricking or scratching sensation in the throat, or of a tired sensation when he talks. These early symptoms are very significant and call for a careful inspection of the larynx. It is the early case that responds readily to treatment. Vocal rest often effects a cure or prevents further development of the disease in early cases.

When definite tuberculous lesions become evident, the symptoms assume a more aggravated character. As a rule, those lesions within the larynx give rise preëminently to voice changes, hoarseness and even aphonia, while those of the arytenoids and particularly of the epiglottis give rise to pain. The pain of tuberculous laryngitis, while sometimes absent, is a most distressing symptom and deprives the patient of the all important benefit of rest and proper nourishment. The constant sore throat or pain, often of an excruciating character and radiating to the ears, jaws or neck, and aggravated during deglutition, is a matter of the greatest concern to the doctor and almost unbearable to the patient. Of course, there are all degrees of severity of symptoms and of lesions of tuberculous laryngitis, and in a general way I have reviewed the general character of this complication of pulmonary tuberculosis.

DIAGNOSIS

As a rule, the diagnosis of tuberculous laryngitis is not difficult. A diagnosis should be made only when an existing pulmonary lesion has been definitely established. I believe I am correct in saying that the diagnosis of tuberculous laryngitis should not be made when the chest X-ray is negative for pulmonary disease. Thus, it is evident that the internist must first tell us whether or not pulmonary tuberculosis is present before we can state that the laryngeal lesions are tuberculous.

It is needless to say that cancerous and luetic lesions of the larynx may be present in the tuberculous, and the usual careful study is always required to rule out these conditions. They may also coexist with tuberculous laryngitis, and I think it was Dr. Beck who reported a case in which all 3 lesions were present.

Within recent years roentgenologists have called attention to the value of X-ray examination of the larynx. Taylor and Nathanson, and Adler believe that it has certain advantages when used to supplement the examination of the laryngologist, in that small intraventricular lesions and those situated deep in the interarytenoid area are demonstrable when not seen by the mirror, and that it gives a permanent pictorial record of the location, extent and prognosis of the lesion.

PROGNOSIS

The prognosis of active tuberculous laryngitis depends most of all upon the progress of the disease of the lungs. Paraphrasing a political expression, one may say that "as the lungs go, so goes the larynx." This is not true, however, in all cases. Certainly all patients with advanced pulmonary disease do not have a laryngeal involvement, and then many observers have seen cases in which the pulmonary disease has retrogressed but the laryngeal condition has improved and has even been cured or arrested. In the 798 cases that came to autopsy at Fitzsimmons General Hospital, in which the chief contributing cause of death was pulmonary tuberculosis, it was not extremely rare to find that the laryngeal lesions had healed or were healing while the pulmonary disease had been progressing (Cooper).

Thirty-nine cases of the 798, or 4.8 per cent, showed healed laryngeal lesions. As a rule, however, if the pulmonary disease improves the laryngeal disease will improve, and vice versa, if the lung disease retrogresses the laryngeal condition gets worse.

A brighter outlook for cure in tuberculous laryngitis is now in prospect. This is evident by the experiences of many laryngologists with considerable experience in the treatment of this condition in large hospitals and sanatoriums. That many cases get well cannot be denied, but the percentage of cures from various sources differs considerably.

Ruedi and Hudson observed 4,881 cases and report a general average of 36 per cent of permanent cures; in cases in which the disease was confined to the vocal cords there were 52 per cent permanent cures.

Vandevere claimed a cure in 80 per cent of cases of moderately advanced disease and even had cures in far-advanced cases.

At the Finsen Institute a healed condition was obtained in 149 cases in a series of 251 patients, or 59.4 per cent.

Stevenson observed 320 cases of which 38 showed clinical cures, 101 were improved, 81 were stationary, 59 were worse, and 41 died.

With the modern method of treatment of pulmonary tuberculosis by collapse theory, we shall see not only fewer cases of laryngeal tuberculosis but more favorable results in the treatment of existing cases. One hundred and six cases at Fitzsimmons General Hospital were studied by Cooper and Benson to determine the effects of collapse therapy on the coexisting laryngeal tuberculosis; 71.8 per cent of cases showed improvement when successful collapse was obtained, and 28 per cent were improved with a partial or unsatisfactory collapse.

TREATMENT

When discussing the treatment of tuberculous laryngitis one must consider first and foremost the general care, in the way of rest and hygiene of a patient with pulmonary tuberculosis. He must regard the laryngeal complication as really an extension of the pulmonary disease, and it is the remedies directed to the cure of the pulmonary infection that will effect the greatest benefit in the laryngeal infection. As has been said, the patient with active lesions involving the larynx almost invariably has similar activity in the lungs, and hospital or sanatorium treatment is indicated although not always possible. Rest in bed either in the home or hospital is always of paramount importance.

As for drugs, many kinds have been used with reports of favorable results, but I doubt whether any drug has in itself ever cured a case of tuberculosis of the larynx. Lactic acid, formalin, guaiacol, chaulmoogra oil and many other medicaments have been used with symptomatic benefit, but none is in any way a specific for this disease. Often they are actually harmful because of the coughing and gagging which their administration entails.

There are 2 local remedies of known and proven value. They are vocal rest and cauterization with the galvanic cautery.

Vocal rest or silence should be insisted upon in the presence of activity in the larynx. This remedy often requires the use of a pad and pencil for communication and must be kept up for a considerable period, often for months.

The use of the galvanocautery has replaced the various surgical procedures, such as amputation of the epiglottis, curettement, etc., and is instrumental both for relieving pain and in effecting a cure.

Anyone who has had experience with the disease under discussion knows that in addition to the remedies directed at the pulmonary lesions, electrocauterization, or, as has been recommended recently by Terry, electrocoagulation, far excels in results any other local remedy. As shown by the experimental work of Fetterolf and Wood, in 1910 and 1911, multiple punctures with a sharp cautery tip repeated at intervals of 2, 3 or 4 weeks tend first to produce a hyperemia or inflammatory zone with an increase of blood vessels and fibroblasts, followed later by cicatrization. Just as in the lung, it is the resulting fibrosis that effects the cure.

I have had some experience in the use of heliotherapy produced by the use of specially constructed mirrors for reflecting sunlight into the larynx. Artificial ultraviolet rays are likewise used to considerable extent today. Many observers have reported favorable results with these 2 forms of treatment, but my experience has been anything but encouraging in their use. I have seen many cases retrogress, and I am not convinced as to their value. Certainly, when used, the greatest caution is necessary, since too prolonged exposure on the delicate laryngeal tissues is extremely dangerous. Active tuberculous lesions can very readily be aggravated by actinic and ultraviolet rays.

Irradiation of the larynx is now receiving some enthusiastic support, but I have had no experience with its use.

Injection or resection of the superior laryngeal nerve, tracheotomy and even gastroscopy are indicated for the relief of pain or dyspnea in some cases.

In conclusion, I want to stress the importance of coöperation between the laryngologist and the internist in the treatment of tuberculous laryngitis. I do not believe that one should ever treat these cases without the aid of a specialist in pulmonary disease. There is no local treatment that can replace the general hygienic and dietetic care given for the cure of the pulmonary disease. Today the modern treatment of most pulmonary tuberculosis is an endeavor to secure a satisfactory collapse of the diseased lung by one of 3 measures—pneumothorax, phrenico-exeresis and thorocoplasty. That these measures are of value in the prevention of tuberculous laryngitis is shown by the statistics obtained by Dworetzky. In 5,382 cases of pulmonary tuberculosis in which collapse therapy had been employed by various phthisiologists in the United States only 12 cases of laryngeal tuberculosis developed, and in these 12 cases the collapse was inadequate to arrest the disease. These figures are very significant. Tuberculosis of the larynx not only does not develop with successful collapse therapy, but in almost all cases there is marked improvement when laryngitis exists and successful collapse is obtained.

We shall see in the future not only fewer cases of tuberculosis of the larynx but a far greater percentage of cures in this distressing disease than heretofore, and these happy results will be attained by more zeal on the part of the laryngologist in his sphere and by the advances now in progress in arresting the pulmonary disease.

BIBLIOGRAPHY

Adler, H.: Roentgen Diagnosis of Tuberculosis of the Larynx. Beitr. z. Klin. d. Tuberk., 1934, **85**, 556.

Cooper, A. T., and Benson, O. O.: Study of Laryngeal Effects of Collapse Therapy in Laryngopulmonary Tuberculosis. Am. Rev. Tuberc., 1932, **25**, 186.

Dworetzky, J. P.: Lung Immobilization in Treatment of Pulmonary Tuberculosis and its Influence on the Larynx; Further Report. Ann. Otol., Rhin. & Laryng., 1930, **39**, 1,111.

Fetterolf, G.: Use of Galvanocautery in Treatment of Tuberculosis of the Larynx. Laryngoscope, 1924, **34**, 290.

Ruedi, T., and Hudson, B.: Notes on Alpine Climate in Connection with Laryngeal Tuberculosis. Brit. J. Tuberc., 1934, **28**, 126.

Stevenson, R. S.: Treatment of Tuberculosis of the Larynx. Brit. M. J., 1933, **2**, 960.

Taylor, H. K., and Nathanson, L.: Roentgenologic Study of Tuberculosis of the Larynx and Neck. Am. J. Roentgenol., 1934, **32**, 589.

Terry, G. H. B.: Electrosurgery in Treatment of Laryngeal and Pharyngeal Tuberculosis. South. M. J., 1935, **28**, 509.

Vandevere, W. E.: Electrocautery in Treatment of Laryngeal Tuberculosis. Ann. Otol., Rhin. & Laryng., 1934, **43**, 572.

WILLIAM CLINE BORDEN*
1858-1934

(Continued from September, 1936)

Daniel L. Borden, M.D.

Associate Professor of Surgery, George Washington University School of Medicine

The Army Medical School was established in 1893 by Surgeon General Sternberg, at which time Walter Reed, then with the rank of captain, was made its first secretary and Professor of Bacteriology. Major Borden was appointed Professor of Military Surgery shortly after being placed in command of the Army General Hospital at Washington Barracks. The work at the school brought these two men in intimate contact, and there developed a friendship founded upon mutual understanding and professional respect. I myself remember Walter Reed as a very kindly man when upon several occasions I saw him at the Army Medical School. It fell to my father's lot to operate upon him for a perforated appendix. As a boy there was imprinted upon my memory a vivid picture of my father standing before the family fireplace in deep meditation and sorrow as he told me of Walter Reed's impending death. For hours he remained there, and in this moment of extreme despair for the only time in his life, expressed a regret for having chosen medicine as his field of endeavor. A letter written to Dr. Howard A. Kelly at a later date gives some conception of the responsibility Major Borden faced in the professional care of his close personal friend who gave to the world the cause and control of yellow fever.

March 16, 1905

Dr. Howard A. Kelly,
Baltimore, Maryland

Dear Dr. Kelly:

In reply to your request I might say that Dr. Walter Reed had suffered for years with what he considered attacks of acute indigestion, and that he never suspected that the trouble was appendicitis, although it undoubtedly was.

The appendix showed marked evidence of previous inflammatory action, the lumen being obliterated in several places. Dr. Reed's symptoms in no way indicated the gravity of the intra-abdominal trouble. When I started to operate I expected to find a case of ordinary catarrhal appendicitis, an appendix in which the inflammatory action was still limited.

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* Read before the George Washington University Medical Society, May 16, 1936. This address appears in two instalments, of which this is the second.

The site of the operation was carefully walled off, but in amputating the appendix a pus cavity was opened. The pus was all carefully sponged out with gauze sponges and I believe none of it escaped from the gauze crater. The appendix was so necrotic at its base that it was simply ligated off. No invagination of the stump could be done owing to the necrotic condition of the cecum in the neighborhood.

The Surgeon General of the Army, Brigadier General R. M. O'Reilly, Major Jefferson R. Kean, and other medical officers, as well as Dr. Wallace Neff of this city, were present at the operation. The operation was not prolonged, although I have forgotten the exact length of time, probably one half hour.

Dr. Reed reacted badly. He was very nervous and "run down" before the operation from overwork. He had been doing a great deal of extra bacteriological work and had been much confined, so that altogether his general condition at the time of operation was very unsatisfactory. This probably accounts in part for his reacting so badly. From the subsequent course of the case I am inclined to think that peritonitis gradually spread from the vicinity of the stump of the appendix, although he did very well for the first 3 days after the operation, so well in fact, that the drain was not removed until the fourth day, being left in with the hope that by that time the infected area would be well walled off. The drain was removed without trouble, and apparently without breaking down any adhesions or interfering with the gut. The next day fecal matter in large quantities came through the wound, showing that the cecum had broken down at or near the place where the appendix was ligated off. Shortly after this symptoms of extensive peritonitis appeared. From this time forward Dr. Reed rapidly grew worse and died the next day, the sixth day after operation.

The case was a particularly trying one to me for the reason that I was a great personal friend of Dr. Reed's, had known him for many years, and his family and my own are intimately acquainted. The case was particularly unfortunate to me professionally, in that it is the only operative case of appendicitis which I have ever lost, although I have operated a large number of times. It seemed particularly unfortunate that of the cases operated upon by me, that Dr. Reed should be the only one to die.

Very truly yours,
William C. Borden,
Major, Surgeon, U. S. Army.

The present Walter Reed General Hospital was for many years known in Army circles as Borden's dream. Six years before Congress saw fit to accept his repeated recommendations for an army medical center, Major Borden began developing the idea of such a scheme. In this connection I quote from Lieutenant Colonel Ashford's article published in The Military Surgeon of 1929, entitled "A Memory of the Walter Reed Foundation." "Colonel William C. Borden, now retired, must always be remembered as the man who put through the Walter Reed Hospital." The history leading up to this inspired dream is worthy of note.

Upon assuming command of the Army General Hospital at the old Arsenal, later to be known as Washington Barracks, Major Borden found his institution on a military reservation under the command of an artillery officer. As commander of the hospital Major Borden was subject to occasional interference from the artillery chief who felt that the hospital was a part of his official domain. This situation led to friction which was not in the least helped by these two commanding officers occupying opposing quarters, separated by a circular park, each looking out upon the other's front yard. The petty warfare came to an abrupt termination in the following manner. A hospital corps man who had deserted was returned to Major Borden after he had been apprehended. Having no guard house, Major Borden sent the prisoner with his compliments to the post commander for safe-keeping. The post commander returned the prisoner with the remark that Major Borden could take care of his own prisoners. One of the articles of war provides for just such an emergency and states that a commanding officer having no facilities for retaining prisoners will transfer said prisoners to the nearest command having a guard house for this purpose. With this in mind Major Borden wired the Adjutant General for instructions. Within the hour the post commander sent his adjutant for the prisoner and accepted from that time on the irritating presence of the hospital unit on his military reservation.

The perplexing situation just cited stimulated into action a brain given to unusual vision. Based upon the firm conviction that the Medical Department of the United States Army should have a reservation of its own, free from outside interference, the Borden dream took firm root with a determination of purpose that aroused little attention or sympathy at first but eventually commanded the respect of two Secretaries of War and finally Congress itself.

For 6 years Major Borden struggled with plans, architects and his dream. For 6 years he hounded the halls of Congress to no avail. His one source of hope and encouragement came from Secretary Root and later Secretary Taft who saw with him the feasibility and necessity for an Army Medical Center. The Surgeon General's Office was occupied at that time with the Medical Reorganization Bill, and although passively interested, they had little hope that a bill for a general hospital would ever pass the halls of Congress.

During his many trips to the capitol, Major Borden met and talked with a Civil War veteran doorkeeper of the Senate. This man complained of a painful neuroma at the end of an arm amputated following a gunshot wound. Major Borden offered to help this veteran and accordingly admitted him to the general hospital at Washington Barracks. On the day of his discharge from the hospital the old man came to thank Major Borden for his kindness. Looking around and seeing the coast clear he volunteered the following important information. "Major, you have helped me and I believe in you and your dream. I know that you have not gotten very far in your efforts on the hill. In my position as doorkeeper I have noticed that any bill dealing with real estate introduced by a certain senator (giving his name) gets recognition. If you can reach this senator I feel reasonably sure that you may succeed in getting your bill through Congress." This bit of information from this grateful patient proved to be the combination that opened the doors of Congress to the earnest plea of a determined man. Two days before the adjournment of Congress in 1906 the bill was introduced and passed. With the passage of this bill Walter Reed General Hospital became a reality. The original appropriation asked for was cut in half which necessitated buying less ground and eliminating many structural features of the hospital.

The selection of the present Walter Reed site is described in a paper presented by Major Borden to the Medical Society of the District of Columbia on October 3, 1906.

> "The hospital site was formerly farm land with a lone frame farmhouse occupying a commanding position on the knoll of land marking the present location of the administration building. The terrain of the site is itself most excellent, for while the site is not level, it consists practically of 5 main elevations upon which the different groups of buildings can be advantageously placed, and the slopes from these are such that perfect surface drainage is assured. When Fourteenth and Sixteenth Streets are extended these fine approaches will be available on the west, putting the hospital in most perfect communication with Washington. In time of war, if necessary, direct railroad communication can be made with the metropolitan branch of the Baltimore and Ohio Railroad, since it passes within a quarter of a mile to the east of the hospital. To the west is Rock Creek Park with its high ridges where temporary camps can be placed if such are required. The establishment ot a general hospital in the District of Columbia, not only for the use of the Army in time of peace, but for its expansion in time of war, is one which immediately appeals to the military expert. When such an establishment meets so many requirements, namely, special advantages for the care of the sick in time of peace, the training of Hospital Corps men for their duties in nursing, the training of medical officers fresh from civil life in administrative and other duties which pertain particularly to the military service, and expansion in time of war, the great use of such an institution in the military service is evident."

At another place in this paper, Major Borden made the following reference that bears out his original idea relative to the administration of a general hospital—to quote:

> "The Army Regulations, paragraph 1,467, state that General Hospitals will be under the exclusive control of the Surgeon General and will be governed by such regulations as the Secretary of War may prescribe. The senior surgeon will command the same, and will not be subject to the orders of local commanders other than those of territorial divisions and departments to whom specific delegation of authority may have been made."

From further on in this same paper the following notation is copied as it was written 30 years ago:

> "Some statement may be made relative to the expansion of the hospital and its combination with other units as a part of a medical military educational institution. The Medical Department stands greatly in need of a fully equipped army medical school, and the site of the Walter Reed General Hospital offers excellent facilities for uniting such a school with the hospital and with companies of instruction of the Hospital Corps, so making a complete educational unit. Equally, in time the library and medical museum of the Surgeon General's office now on the corner of Seventh and B Streets, Southwest, will have to be provided for elsewhere. It is hoped that with a suitable place for locating the library, a proper building may be erected on the site of the Walter Reed General Hospital when the necessity for such a building occurs. The total ex-

pansion upon the site, therefore, covers a medical military institution having for units the academic building of the Army Medical School, the Walter Reed General Hospital, barracks for two companies of the Hospital Corps, and finally, the library and museum of the Surgeon General's office."

The original plans with the architect's drawing incorporating all of these units can be seen on the walls of the Medical School at the Walter Reed General Hospital (Fig. 1). The Army Medical School having taken its place in the original scheme of things, it remains to be seen whether the Surgeon General's Library will be transferred to the Walter Reed Medical Center.

The selection of the present site and the actual beginning of the building of the hospital culminated Major Borden's greatest contribution to the Medical Department, United States Army. He was soon to be ordered to the Philippine Islands for foreign service. Although schooled to military discipline, it was a great disappointment to him that he was not allowed to remain in Washington long enough to be the first commander of the hospital that he had been instrumental in founding.

At about this period, with the encouragement and foresight of my mother, a small summer cottage had been built on the shores of Lake Ontario. This furnished the playground for my brother and myself during our vacations, and it was here that we were initiated into the art of sailing. Having built a sailboat of his own design Major Borden entered into competition in the races sponsored by the Crescent Yacht Club located at Chaumont, New York. Ultimately he succeeded in capturing the Club Championship but the road to final victory was strewn with many trials and tribulations. A man not given to the use of profanity, Major Borden would in the heat of excitement occasionally give way to his feelings. Before a race he would exhibit a nervousness not in keeping with his usual calm disposition, and I have on many occasions seen him get up from the table to eat his meal while pacing the floor looking out on the water to finally make up his mind as to the best sail to carry in the forthcoming race. These were trying days for my mother who patiently accepted the situation to await the return of a beaten or victorious crew. The inevitable postmortem following each race would last far into the night, and the next morning would find an inspired crew hard at work correcting any defects discovered the day before. It is impossible for the average individual to understand the effort, thought and trial, that enters into the grooming of a boat for racing. Before attaining her final form this boat had a

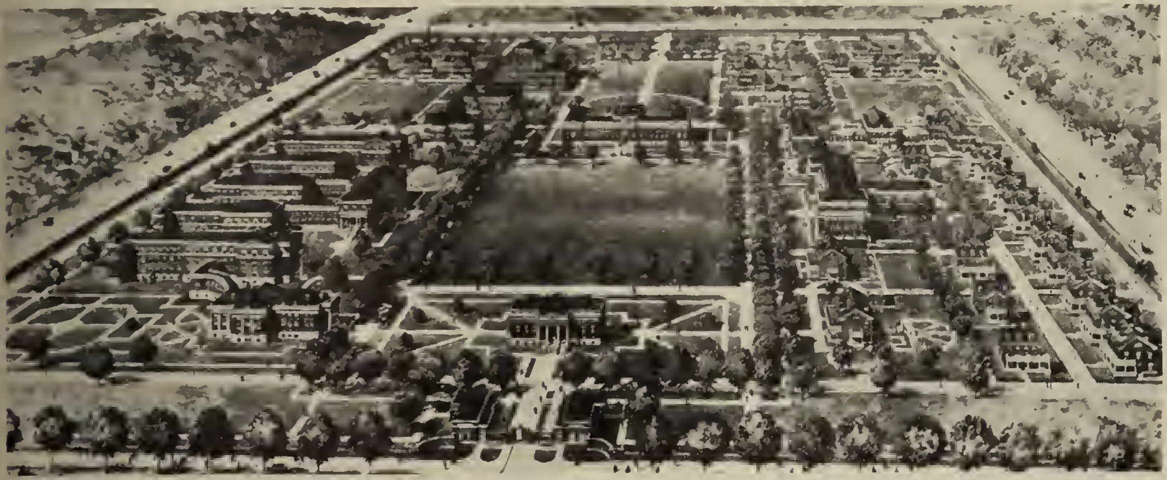

Fig. 1. Original Plan of the Proposed Army Medical Center Submitted by Major William Cline Borden 30 Years Ago (1906). The Plan Includes the Walter Reed General Hospital, Army Medical School, Army Medical Museum, Administration Office, Officers Quarters, Hospital Corps Unit, Gymnasium, Central Heating Plant, etc.

new keel, her body was extended 6 feet, a cabin was added, to say nothing of several changes in her entire sail-plan. Every move was carefully thought and thrashed out and finally tried under racing conditions. Now the good ship "Latonka" that carried us to final victory and through many a storm is a memory. She herself was the victim of a young hurricane that tore the roof from the Crescent Yacht Club, carried it through the air straight for a body blow that wrecked for all time the good ship, Latonka.

In 1908 Major Borden was off to the Philippine Islands where he first reported for duty at Jolo and later was given command of the Division Hospital in Manila. The trip to Manila combined with tropical service seemed to aggravate a serious dental infection that had a direct toxic effect upon his heart. In 1908 while appearing before the promotion board to be advanced to the rank of Lieutenant Colonel this condition was recognized and he was retired from the United States Army with his advanced rank. He had given 25 years to the service and was just at the half century mark when he established an office in Washington to take up the private practice of surgery.

In the fall of 1908 I entered the George Washington University Medical School. Prior to this Dr. Ford Thompson, one of the foremost surgeons of his day, held the chair of surgery until his death. Through my association with the school I learned that the Professorship of Surgery would be announced by the Board of Trustees at their meeting in April, 1909. Becoming aware of this fact, I personally persuaded my father to apply for this position. At first he was reluctant to take this step but eventually asked some of his friends for letters of recommendation, among them Dr. William Mayo, the Surgeon General of the Army, the Surgeon General of the Navy and others. These letters are all on file and refer to the Professorship of Surgery only.

About this time there appeared a disturbing note in the daily press to the effect that the then Dean of the Medical School would not be reappointed. This situation had a foundation of truth, in that there had developed between the Dean and the President of the University a difference of opinion pertaining to the administration of the Medical School. At this stage of the situation the President of the University approached my father and informed him that the Board of Trustees had at their last meeting informally decided not to reappoint the present Dean whose term of office would expire at the end of the school session. President Needham then asked my father if in the event of a vacancy would he consider the Deanship as well as the Professorship of Surgery.

The critical situation at the Medical School made this decision a difficult one to meet. The Medical School had run over its budget the preceding as well as the current year. The school and hospital ran as separate units. The Medical School was a proprietary institution catering to the so-called night student. Although linked to the University it was expected to be self-sustaining, deriving its financial support from students' fees. Because of impending faculty changes that had been thoroughly aired in the press there was an instability within the portals of the school itself. The reorganization of a medical school threatened with extension was a challenge.

On May 19, 1909, the President of the University sent the following letter:

> The George Washington University
> May 19, 1909
>
> Dear Doctor Borden:
>
> I am pleased to inform you that at a meeting of the Board of Trustees you were appointed Professor of Surgery in the Department of Medicine of this University. You were also designated as Dean of the Department of Medicine for the term of 2 years beginning June 15, 1909.
>
> It gives me great pleasure personally to have you thus connected with us, and I believe that working together, with the faculty in harmony, a fine School of Medicine will be established in this University.
>
> Trusting to receive your acceptance of the positions named, I am,
>
> Sincerely yours,
> CHARLES W. NEEDHAM.

In this hall, April 26, 1910, 26 years ago before this Society (George Washington University Medical Society) Dean Borden inaugurated his administration by reading a paper entitled "The Trend of Medical Education in the United States." His survey and conclusions reached at that time can best be understood by reading his report made to the President of the University:

> "I was appointed Dean of the Medical School in June, 1909. On assuming this position, I found the school inefficiently organized and generally in bad shape.
>
> I proceeded to rectify this condition and had been at work but a few weeks when I received a letter from the Council on Medical Education of the American Medical Association calling attention to the fact that no communication had been received by the Council to indicate that defects in the school to which attention had been called, had been remedied; that the Council would soon issue a classification of medical schools, and unless assured that the school had improved, it would not be rated as acceptable.
>
> This was the first intimation I had of the Council's action. I could not find the Council's letter giving the school's defects nor could it be found in the files of the University.
>
> I thereupon, by consent of President Needham, went to Chicago, appeared before the Council, explained the situation, informed it of the improvements made and under way, and secured the placing of the school on the acceptable list as of 'Class A.' "

Upon his own personal promise and assurance Dean Borden secured for the School of Medicine the rating that it has maintained to this day. It was in 1910 that the Council on Medical Education of the American Medical Association made its first report following the inspection of medical schools in this country. Less than half of the medical schools examined at that time were placed upon the accepted list.

Historically it is of interest to quote the conclusions outlined in Dean Borden's address before your society already referred to:

> "1. It is no longer possible to conduct an adequate medical school on a commercial basis.
>
> 2. A medical school should now be considered a school of applied science.
>
> 3. A medical school should be an integral part of a university.
>
> 4. A minimum entrance requirement of 4 years high school should be strictly enforced."

My memory goes back to the effort and determination that it required to carry out these resolutions. Entrance requirements were at that time passed upon by the Dean. His was the law and final word. At the door-step of the Dean's office pressure was offset with a determination to maintain at all costs the standard established to elevate the school.

The struggle to maintain the Medical School as a class "A" institution was to continue throughout his administration, and, indeed, to keep the school open became a major problem.

Persistent attacks in the daily press directed at the Medical School continued and were finally answered by Dean Borden as follows:

> THE EVENING STAR
>
> *Thursday, June 17, 1909*
>
> DR. BORDEN ANSWERS CRITICS
>
> G. W. U. Medical School in High Standing
>
> Graduates Well Represented in Army Corps—Only 37 Institutions have Larger Enrollment
>
> Dr. W. C. Borden in assuming his duties as Dean of the Medical Department of George Washington University, made public his plans and outlined the policies which will govern his administration.
>
> He made a spirited defense of the School, and declared that the harsh criticism issuing from official quarters recently was based upon inadequate information. Of the 120 regular medical schools in the country, only 37, Dr. Borden pointed out, have a larger enrollment than George Washington University. By the ordinance recently passed by the Board of Directors of the University the administration of the Medical Department has been radically changed. The hospital has been directly connected with the medical college, under the central control of an executive committee.
>
> By these means the clinical facilities of the Hospital will be entirely under the control of the faculty, and can be utilized in the instruction of students.
>
> "Under the old system this school and hospital were under separate administrative heads, and clinical teaching of students in the hospital could not be controlled by the teaching members of the faculty."
>
> "The Medical School has always had a high standing. It is one of the oldest medical schools in the United States, the first course of lectures having been given in 1825, and its eighty-ninth session will begin in September of the present year."
>
> "The standing of the Medical School is such that its graduates are accepted by the Medical Department of the United States Army without examination in the preliminary branches; in fact, 10 per cent of the Medical Corps of the United States Army are graduates of this institution."
>
> "The impartiality and severity of the examinations for entrance to the Medical Corps of the Army have never been questioned, and yet there are but 2 medical schools in the entire United States which have a higher percentage of successful candidates than has this school. The honor man of this year's class in the Army Medical School was a graduate of this school."
>
> "These facts are sufficient to show the good work that has been done and that will continue to be done in the school. The institution has a record of which it has every reason to be proud, and it is but justice to the school and the community which it serves that these facts should be known."

Within a few days of the opening of the Medical School following his appointment as Dean, the Professor of Bacteriology and Pathology resigned to accept a position in the District Government. This resignation gave rise to further discussion in the public press that was calculated to convey the impression that there was further disagreement with the administration. There was no truth in this insinuation. Dean Borden met this emergency by securing his personal friend, Major Frederick F. Russell, to head the Department of Bacteriology and Pathology. President Needham in his report to the Board of Trustees stated:

> October 13, 1909
>
> Board of Trustees:
>
> The first-year class in all probability will be considerably smaller than last year. This is (probably) due to several causes, namely, the entrance requirements have been rigidly enforced; the criticisms which have appeared in the public press; and the poor standing of the graduates of this school before state examining boards for the last 3 years. There has been a gradual increase in the percentage of our graduates who failed before state boards during the last 3 years; this summer we fell below every school in this District. This unfortunate condition can be attributed to only two causes: First, the failure to properly enforce the admission requirements, thereby letting in poor pupil material, and second, work in this department has, in some particulars, been sadly neglected and poorly done. We have been able to fill the Professorship of Bacteriology and Pathology with a very eminent teacher and scientist; Dr. F. F. Russell, Professor of Bacteriology and Pathology at the Army Medical School, and Curator in the Army Medical Museum, who with 3 of his assistants from the Army Medical School, will give all the time required to this work. As the successor of Reed and Carroll, Dr. Russell needs no other introduction. He is well and widely known, both as a scientist and a teacher, and has entered upon his work with the greatest of enthusiasm and believes in the policy for better work in the Medical Department. Our Dean said to me yesterday that the work was already thoroughly organized and that he could say from a personal knowledge of many laboratories and medical schools that there was not a school in this country where the subject of bacteriology and pathology will be better taught than in our own under Dr. Russell. The Dean of the Medical School is enforcing rigidly the standards of admission, even at the loss of students. The classroom work is being thoroughly organized and superintended. Each department is made responsible for its own work, and there is complete harmony in the faculty."

The reorganized School of Medicine settled down to slow but definite progress. Matriculation increased and graduates appearing before state boards improved the prestige of the school to the extent that it compared favorably with the best institutions in the country. The school was given full credit by the Royal Medical Examining Boards of England, a recognition extended to but 18 other medical schools in the United States. The class of 1912 graduated among its numbers the last of the night medical students to be given a diploma from the George Washington University.

On July 27, 1914, the Dean, representing the George Washington University Medical School at the Fifth Annual Session of the Clinical Congress of Surgeons of North America held in London, found Europe in the throes of war, and he was fortunate in securing passage home on the steamship Philadelphia, the first ship to reach the United States after the outbreak of hostilities. When our own country entered the strife he returned to active duty in the capacity of Lieutenant Colonel and was assigned to duty at the Walter Reed General Hospital in charge of the Surgical Service. During this period he retained a supervisory contact with the Medical School. He remained as the head of the Surgical Service throughout the War and was discharged from active duty on January 13, 1919, to resume his duties as Dean of the Medical School.

The Great War was history when the problems at the school assumed alarming proportions. The Board of Trustees, through the influence exerted by some members of the Academic and Legal Departments had never accepted the principle that the University should lend financial support to the Medical School. This had been a bone of contention based upon the old idea of a proprietary school. The Medical School in its effort to maintain an acceptable standing was requiring more funds. Efforts to get financial help met with little success as illustrated by the following letter:

> November 26, 1919
>
> To the President of the University.
>
> My dear President Collier:
>
> I wish to emphasize one fact in reference to the conduct of the Medical School and Hospital, which I think should be made very clear to the minds of the members of the Board of Trustees. That is, that both the Medical School and Hospital can be run at a somewhat lower cost than now but this will be at the expense of the modest degree of efficiency which we now have. If the Board of Trustees desire the Medical School and Hospital to be run at a lower expense, the attempt will be

made if they so direct, but if made, the Board of Trustees must understand that they may expect and subject themselves to such criticism as may arise from adopting a more economical course.

Very truly yours,
W. C. Borden, M.D.
Dean.

In his appeal to the President of the University, the Dean wrote as follows: "With the increased cost of conducting the school and no action taken toward remedying existing defects, I feel that our classification cannot be much longer maintained."

Within the year the American Medical Association had its inspectors out again. The following conclusions reached by Inspectors Dr. William Pepper and Dr. N. P. Colwell are worthy of note to illustrate the situation the Medical School found itself facing after the War.

> "The laboratory facilities are very meager; the dispensary and hospital material is seriously deficient. An essential minimum of full-time expert professors in the laboratory branches is lacking and the library and museum are not satisfactory. Unless the school can secure an increase in its finances; unless it can make special provision for dental students; unless it can provide the needed number of full-time teachers and unless it can secure in close proximity a teaching hospital of adequate size, it will be impossible to retain it among acceptable medical colleges. The future prospects of this school are very unpromising."

The American Medical Association having placed itself on record as above stated, there remained but one course to pursue, namely, to meet their requirements or close the school. The Dean accordingly sent the following communication to the President of the University:

> "As a result of the inspection of the American Medical Association as well as my own knowledge of the present-day requirements of medical education, I am of the opinion that the school cannot continue as an efficient teaching institution unless the following can be had before the opening of the next session:
>
> A. Complete separation of medical and dental teaching.
>
> B. Exclusive use of the medical building by the Medical School, except use of the lecture hall by the Law School after 5 o'clock.
>
> C. Employment of more full-time teachers in laboratory subjects and one full-time and two part-time teachers in the clinical branches.
>
> D. The insurance of at least $25,000.00 annually for the University budget in excess of students' fees.
>
> If the Trustees are not prepared to take immediate action, I request authority to inform the student body that the school will be reorganized before next session or will be discontinued after Commencement in June (and) while still in class 'A.' This will serve to prevent disturbance of the student body, as it will assure them of the continuance of the school, or their ready transfer elsewhere as class 'A' students should the school close. I also request authority to call a meeting of the Faculty and Alumni in order to place the situation plainly before them looking to possible helpful action by them. In order to prevent erroneous or garbled information and public misconception, I suggest that a clear statement of the case be made for publication by the press."

This letter put the whole matter squarely up to the Board of Trustees of the University and served to focus final attention upon the internal contention that existed at that time. The Department of Arts and Sciences and the Law School feeling that funds brought into the University through their departments should not be diverted to the Medical School expressed a strong sentiment that the Medical School should be discontinued. A special meeting of the Board of Trustees was called to decide the issue.

With the existence of the Medical School hanging in the balance, the Dean, the Assistant Dean, Dr. Oscar B. Hunter, and Dr. Sterling Ruffin appeared in person before the Board of Trustees to urge the continuation of the school. After a 5-hour session their appeal was successful. April 3, 1920, marks the turning point in the history of the School of Medicine of the George Washington University. The policy of University support accepted 16 years ago has continued and today its efforts are rewarded by our present splendid institution.

Following the action of the Board of Trustees the Dean sent the following communication to the Secretary of the Council of the American Medical Association. This communication sums up the action taken by the Board of Trustees in their decision to carry on with the Medical School:

March 21, 1920

Dr. N. P. Colwell, Secretary,
Council on Education,
American Medical Association,
Chicago, Illinois.

Dear Doctor:

It appears that the University is now willing to obligate itself to the following and soon announce it as a definite obligation of the Board of Trustees, i.e., the adoption of a definite policy covering a period of 5 years and having the following provisions:

1. The definite allotment of $25,000.00 annually to the Medical School (exclusive of hospital) in addition to students' fees.

This will allow the employment of the minimum number (12) of full-time teachers and the formation of a clinical division with a director and 3 assistants. The first year these 4 will all probably be part-time but with definite obligations as to time and service.

2. The discontinuance of the dental school and concentration of all teaching on medicine so that the full-time teachers will be teaching medical students only.

3. The turning over of the Medical Building to the Medical School and the reconstruction of the interior of the building so that all dental space will be given over to medical laboratories (for this $4,000.00 will be allowed). For a short time the Arts Chemistry of Columbian College to be allowed use of the Chemistry Laboratory in connection with medicine, this use to be after 5 P.M. and no joint teaching or mixing of medical and arts students.

4. The immediate development of a museum in a well-lighted room set apart for this purpose, the museum and its development to be in charge of the Professor of Pathology.

5. The rehabilitation of the library, the binding of current periodicals including the Index Medicus up-to-date, subscription to an adequate number of current periodicals, purchase of standard new books, and employment of a full-time woman librarian.

6. The adequate equipment of the laboratory of physiological and clinical chemistry.

7. Increased care in evaluations of entrance credentials and admission to advanced classes.

8. The adoption of University policy determining that the property now occupied by the Medical School and Hospital be sold as soon as sale can be advantageously made, that ample ground be purchased elsewhere and a new medical building or buildings be erected thereon, including a University Hospital, provided sufficient funds can be secured to erect and support a proper hospital.

9. That at present clinics of existing hospitals be systematically utilized to the greatest possible extent and with every possible economy of students' time. Thus, by establishing a responsible clinical division to correlate and supervise all clinical teaching and by conferences with clinicians and students insure the quality and quantity of instruction. It is believed that by such means students can be assigned to hospitals for full-day or half-day periods, there to do clinical clerkship and have bedside teaching. At St. Elizabeths (over 3,000 beds) where autopsies are frequent, excellent clinicopathological conferences can be had.

10. The continued attempt to form definite affiliations with good existing hospitals, this being favored by the betterment of the school, brought about by the adoption of the definite policy and improvements above outlined.

If action as above given is taken by the University authorities, can the school be continued in Class A?

Very truly yours,
W. C. Borden, M.D.,
Dean

During the following years a gesture was made to affiliate with Garfield Memorial Hospital, but this failed when the Gallinger Municipal Hospital developed its plant and allowed our school the privilege of clinical teaching within its confines. The clinical facilities thus obtained entirely satisfied the requirements of the American Medical Association and this hospital is being used today for this purpose.

A memorandum submitted to President Marvin shortly before the Dean's final illness presents rather clearly the outlook the Dean had for the future of the Medical School. I give this, not only as his vision, but as his hope, for the institution that he served as Dean for 21 years, 1909 to 1930.

January 24, 1929

The President,
George Washington University,
Washington, D. C.

My dear President Marvin:

The City of Washington by reason of its great libraries, museums, government departments and clinical facilities, presents advantages for the development of a medical teaching and research institution of the highest type. Certain of these advantages are unequalled elsewhere in this country and perhaps in the world. . . .

The School of Medicine of this University now has a site and plant inadequate for the development of the ideal institution.

The ideal policy is the construction and equipment of a new medical school building, adequately manned and directly connected with a properly endowed University Hospital with at least 200 beds for teaching and an adequate outpatient department; the clinical opportunities of the Municipal Hospital and the very special opportunities for the teaching of psychiatry at the Government Hospital for the Insane to be utilized in addition to those afforded by the University Hospital.

I wish to emphasize the great desirability of having a University Hospital for correlated and intensive teaching and for research in connection with a high-grade School of Medicine, but, if the construction and endowment of such a hospital cannot be had at this time, I recommend that the School of Medicine be so constructed that a hospital can be added later, and that sufficient ground be secured for this purpose as well as for the addition of a School of Dentistry, a School of Pharmacy, a School of Graduate Medicine and a School of Public Health.

Respectfully submitted,
William C. Borden, M.D.,
Dean, George Washington
University Medical School.

The following year while at his summer home the Dean developed cerebral thrombosis. This incapacitated him from further service to the Medical School and he tendered his resignation. Four years later a second cerebral accident terminated his life.

MEDICAL ANNALS

of the

DISTRICT OF COLUMBIA

Editorial Office, 1718 M Street, N. W.

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FROM: The Board of Directors, Medical-Dental Service Bureau, Inc.
TO: The Members of the Medical Society of the District of Columbia.

The Health Security Administration for the District of Columbia with headquarters at Eighth and Eye Streets, N. W., appears to this Board to be the logical solution of the problem of providing adequate medical and dental care to all residents of the District of Columbia in a way that upholds the principles of democracy.

The full fruits of the efforts of the medical and dental societies in developing this plan cannot be obtained, however, except through the coöperation of all members of the medical and dental societies. You can coöperate by making yourself familiar with the details of the organization and policies of the Health Security Administration for the District of Columbia and by utilizing the facilities in dealing with the economic problems of your patients.

In particular, your utilization of the facilities of the Medical-Dental Service Bureau, Inc., will greatly enhance the value and success of that unit of the Health Security Administration, bringing to the public of moderate income aid for the sick not otherwise obtainable. This Bureau was set up in order to make it possible for individuals to obtain prompt medical and dental care, meanwhile maintaining their self-respect by paying according to their ability the physician, dentist, or hospital of their choice by means of the instalment plan of payment. This is a non-profit organization controlled by the physicians, dentists and hospitals of the District of Columbia. Three hundred and seventy-six (376) physicians and one hundred and twenty-one (121) dentists and practically all of the hospitals have been permitting patients to secure the services of the Bureau. Those who have used the Bureau consistently have found it to be of great advantage to them.

We should like to urge you, therefore, if you have not already done so, to begin to take advantage yourself of the facilities offered by the Medical-Dental Service Bureau and in that way to help the medical and dental professions to make it possible to boast that in the District of Columbia there is not a soul, no matter what his economic status, who cannot promptly secure adequate medical and dental care today.

In conclusion, we wish to say that it is our opinion that the successful promulgation of such plans as the so-called Washington Plan is the answer to the proponents of state control of all medical affairs.

Fraternally yours,
Board of Directors,
Medical-Dental Service Bureau, Inc.

DIPHTHERIA IMMUNIZATION

On Monday, October 5, the Department of Health inaugurated a campaign for the better protection of child life in the District of Columbia against diphtheria and the ultimate eradication of this disease from the District of Columbia.

Diphtheria in the District of Columbia still runs disproportionately high. At the present writing there have been recorded since the first of the year 673 cases and 22 deaths.

The effort of the Department will be essentially an educational one in which the Department will endeavor to have parents secure the protection for their children at the hands of the family physician. Through the press and radio the Department will undertake to urge parents to secure this diphtheria immunization. The Department recognizes that both for the purpose of getting a campaign going, that is, to stimulate public interest to the extent that families will do what they see others do, as well as for the purpose of offering the protection to those of the low economic income group, it will be necessary to actually conduct immunization clinics. It has, for that purpose, planned to offer immunization treatments to the children of the economically disadvantaged at public expense.

As a matter of convenience these clinics will be conducted in designated public schools, authorization for the utilization of the schools for this purpose having been obtained from the Board of Education. The campaign will aim to reach particularly the child of kindergarten and preschool age. Washington has approximately 40,000 in this age group. The Department is planning to reach perhaps one fourth of this group, trusting that three fourths may be dealt with by the family physician.

For the purpose of carrying out the campaign, the Department proposes to add to its staff of 4 in the Bureau of Epidemiology, 6 physicians, 6 nurses and 6 clerks, to be organized in as many teams, all to be employed on a part-time basis and paid out of moneys made available to the Department under the Security Act. The campaign itself will extend over 6 weeks and should be looked upon essentially as an educational demonstration. The coöperation of the profession again is earnestly solicited and the Department will appreciate receiving from the physicians the record of the number of children that have been immunized during the campaign. This record is important to the Department not only in securing more reliable data with regard to the extent that children are immunized, but also to gauge the effect of the Department's campaign in arousing public coöperation in securing immunization at the hands of the private practitioner.

RESOLUTION CONCERNING HEALTH DEPARTMENT BUDGET ADOPTED BY THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA IN SESSION, OCTOBER 7, 1936

On September 10, 1936, the Executive Committee of the Medical Society of the District of Columbia, acting for the Society during its recess, instructed a special committee to appear at a hearing before the Commissioners of the District upon the estimates for the Health Department for the forthcoming budget and to present the following resolution upon the proposals of the Health Officer, particularly with reference to the erection of two Health Centers:

> "Inasmuch as the establishment of the proposed health centers for the avowed purpose of the control and treatment of certain communicable diseases, including particularly tuberculosis and the venereal diseases, would entail a tremendous initial and annual financial burden upon the taxpayers of the District of Columbia for new structures and personnel, and inasmuch as the care of indigent patients hospitalized in the wonderfully built and equipped Gallinger Municipal Hospital is at present rendered to an extent futile by the lack of sufficient appropriation for full-time personnel, and inasmuch as there have existed for many years efficiently managed clinics for the treatment of all kinds of diseases (including tuberculosis and venereal diseases) in most of the large private community hospitals for the benefit of all persons in need of free medical care without the outlay of funds on the part of the taxpayers for construction, maintenance and even professional services, and inasmuch as the failure of control of these communicable diseases has been due to lack of standardization of treatment and criteria of cure and to lack of adequate social service follow-up and control, therefore, be it
>
> RESOLVED, That the Medical Society of the District of Columbia reiterates its plea for adequate appropriations to supply the deficiencies in personnel and laboratory facilities for the control of communicable diseases, but believes that such funds can be most economically expended through the utilization of already established clinics by means of cooperative efforts between the Health Department and the staffs of the community hospital clinics; this cooperation to include the active participation of the Health Department in the maintenance of standards necessary for the purposes of the public health, and the establishment of a social service department to assure attendance of patients at these clinics."

At a regular meeting of the Medical Society of the District of Columbia held October 7, 1936, the foregoing resolution was endorsed in regard to the economic principles involved with respect to the professional services required in the actual treatment of communicable diseases under consideration, but in view of the assurances of the Health Officer that the proposed Health Centers are for the purpose of giving adequate and much needed housing facilities for already established agencies of the Health Department, for supplementing existing deficiencies in established hospital clinics, and for housing the social service personnel requested and endorsed by the Society, the proposed two Health Centers are deemed desirable by the Medical Society of the

District of Columbia, and the estimates of the Health Officer for their erection and maintenance are endorsed.

It is the understanding of the Medical Society of the District of Columbia in endorsing the erection of the proposed Health Centers that it will be the policy of the Health Department to continue to utilize and aid existing clinical facilities in the hospital dispensaries so far as they are available and adequate, and that the Health Centers will be erected in sections of the city not adequately and conveniently served by such clinics. The Society further understands that the facilities of the Health Department in social service and laboratory aid thus set up will be available to the community hospital clinics in order that they may properly serve the public health needs of the city, and that the activities of the Health Department extended by these Health Centers will be limited to the bona fide needy poor, using the facilities of the Central Admitting Bureau for Hospitals as a test of need.

DELEGATES TO FEDERATION OF CITIZENS' ASSOCIATIONS

Drs. Charles B. Campbell and Harry Lee Claud have been appointed for the coming year by the President, to represent the Society in the Federation of Citizens' Associations.

RADIO BROADCASTS

Medical Society of the District of Columbia

The Committee on Public Information, Dr. William P. Herbst, Jr., Chairman, has just released the program for October, November and December. The Family Doctor series* with anonymous speakers will be presented over Station WMAL, at 11 a.m., each Thursday, as follows:

October 1: "The Doctor's Scotland Yard."
October 8: "Carbonmonoxide Poisoning."
October 15: "Your Doctor and You."
October 22: "Modern Use of Physical Therapy."
October 29: "Focal Infection."
November 5: "Fifty Years of Medical Progress—Ten Outstanding Achievements of Medical Science."
November 12: "What's Behind a Presumption?"
November 19: "The Art of Visiting the Sick."
November 26: "Tonics and Sedatives."
December 3: "Angina Pectoris or Exercise for the Middle Aged."
December 10: "Basal Metabolism Explained for the Layman."
December 17: "Influenza and Common Cold."
December 24: "Holiday Health."
December 31: "New Year's Resolution for the Doctor and Layman."

COMING MEETINGS

Friday, October 23: *The Section on Internal Medicine.* "The Development of Thought on the Etiology of Pernicious Anemia." Theodore G. Klumpp, M.D., Assistant Clinical Professor of Internal Medicine, Yale University.

Wednesday, November 4: Stated Meeting of the Society. Reports of committees, election of members, etc.

Wednesday, November 11:

1. "Purification of the Water in the Washington Filtration Plant." Mr. J. E. Curtis, Superintendent.
2. "New Technic for Thorocoplasty. Review of 22 Cases." Edmund Horgan, M.D.

Wednesday, November 18:

1. "Bone Marrow Findings in the Diagnosis of Certain Blood Dyscrasias." G. Louis Weller, Jr., M.D.
2. "Plastic Surgery Around the Orbit." Robert E. Moran, M.D.

Wednesday, November 25: Thanksgiving Eve—no meeting.

NEWS AND PERSONALS

Drs. J. Russell Verbrycke, Jr., and Harry S. Bernton were nominated by the Executive Committee to serve on the Board of Directors of the Medical-Dental Service Bureau, Inc., and were duly elected by the Board. They have also been nominated and will serve on the Board of Directors of the Central Admitting Bureau for Hospitals.

Drs. Charles Stanley White and J. Lloyd Collins, upon invitation, had a scientific exhibit on "Empyema" at the Interstate Medical Assembly held in Saint Paul, Minnesota, October 12–16, 1936.

Dr. Wallace M. Yater gave an address on the subject of "Arteriography With Reference to Peripheral Vascular Disease," on October 21, at the Seventh Annual Postgraduate Seminar of the Easton Hospital, Easton, Pa. The other speakers on the program were Dr. Norman M. Keith, Associate Professor of Medicine, Graduate School of Medicine, University of Minnesota, and Dr.

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* Advise your clientele of this instructive series.

Walter E. Dandy, Professor of Neurosurgery, Johns Hopkins University.

Dr. Walter Schiller, of the University of Vienna, and **Dr. Reuben Kahn**, Director of Laboratories, University Hospital, Ann Arbor, Michigan, were the guests of the George Washington University School of Medicine on Thursday, October 1, 1936. Drs. Schiller and Kahn addressed the students and faculty, Dr. Schiller's subject being "Morphology of Ovarian Tumors," and Dr. Kahn's being "Immunity in Syphilis."

Dr. R. J. Anderson, Professor of Biochemistry of Yale University, will give a Seminar at the George Washington University School of Medicine on Friday, October 23, 1936, on "The Chemistry of the Acid-fast Bacteria."

Dr. Richard P. Strong, of the Department of Tropical Medicine, Harvard University School of Medicine, will speak at the Smith-Reed-Russell Lecture at the George Washington University School of Medicine on Thursday, October 22, on "The Dysenteries."

Dr. Clarence Mills, Professor of Experimental Medicine, University of Cincinnati, addressed the senior class of Georgetown University School of Medicine on October 7, on "The Influence of Climate on Health and Disease."

Dr. Claude Beck, Associate Professor of Surgery, Western Reserve University School of Medicine, Cleveland, Ohio, addressed the senior class of Georgetown University School of Medicine on October 15 on the subject "The Surgical Treatment of Certain Forms of Heart Disease."

The Academy of Physical Medicine holds its annual meeting in Boston, Massachusetts, at the Hotel Statler on October 20–22, 1936. The program is educational in character and contains symposia and reports on the newer studies and clinical developments in Physical Medicine presented by recognized authorities in the various fields of medicine and basic sciences. The 3-day program opens with reports of the standing committees and special surveys by Drs. William F. Roberts, Minister of Health, St. John, N. B., Franklin P. Lowry, Newton, Mass., and William D. McFee, Boston, followed by presentations on the physics and biology of physical medicine by Drs. E. Leon Chaffee, Gordon McKay, Professor of Physics and Communication Engineering, Harvard University, Byron Sprague Price, of New York City, and Heinrich Brugsch of Tufts College. Many other interesting symposia and papers are included in the 3-day program. At 12 o'clock, noon, Dr. Frank Hammond Krusen, Mayo Clinic, Rochester, Minn., presents the Presidential Address on "The Present Status of Physical Medicine." An informal dinner at the Ring Sanatorium is scheduled for Tuesday evening, October 20. The Annual Academy Banquet takes place on Wednesday evening, October 21, at the Hotel Statler. An elaborate program has been arranged for the visiting ladies. All members of the medical profession are cordially invited to attend. A program will be mailed on request to Drs. William D. McFee, Chairman, Executive Committee, 41 Bay State Road, Boston, Mass., or Franklin P. Lowry, Secretary-Treasurer, 313 Washington Street, Newton, Mass.

The **Southern Medical Association** will hold its Thirtieth Annual Meeting in Baltimore, Md., November 17–20, 1936. Write for hotel accommodations now. Many will want to commute; in any event do not miss the important scientific sessions and the well-known accompanying social features of a Southern Medical Association meeting.

In **Celebration of the One Hundredth Anniversary of the Army Medical Library** on November 16, 1936, at 8 P.M., in the library building, Seventh Street and Independence Avenue, S. W., Sir Humphrey Rolleston, Bart., of Surrey, England, will deliver the oration. Major General Charles R. Reynolds, Surgeon General of the Army, will act as host and Colonel Harold W. Jones, Medical Corps, librarian, will be in charge of the meeting. As result of the labors of Dr. John S. Billings, who was librarian for 30 years, world-wide fame has been achieved by the Army Medical Library. Surgeon General Lovell was the founder in 1836.

REPRINTS RECEIVED

The following reprints have recently been received for which due acknowledgment is made:

"Radiation Therapy," Joseph F. Elward, M.D., Radiology, January, 1936.

"Onychomycosis Universalis Trichophytina et Epidermophyta. Report of the Seventh Case thus far Recorded in English," Herman E. Kittredge, M.D., Archives of Dermatology and Syphilology, September, 1936.

MEDICAL ANNALS
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UREMIA*

R. M. LECOMTE, M.D.
Professor of Urology, Georgetown University School of Medicine

Under the various terms of uremia, renal insufficiency, urinary toxemia, etc., may be included the several symptoms, signs and syndromes which may develop as a result of any extensive loss of kidney tissue. For the sake of an exact phraseology, it would perhaps be desirable to discard the word uremia and to substitute for it the term renal insufficiency, but long usage justifies the continuance in use of the former term and precludes the adoption of another more exact one until the nature of the bodies that cause the disturbance is known more accurately than it is at present.

Due to the complicated relationships of the kidney to the metabolism of the body as a whole, and to certain peculiarities in the pathologic physiology of the organ, an identical sign or symptom of uremia may have one meaning in one patient and an entirely different significance in another observed under somewhat different circumstances. Accordingly, any of the signs or symptoms of recognized uremic origin must be carefully interpreted and coordinated with the history, symptoms and signs of disease that the particular patient under consideration presents.

The normal physiology of the kidneys involves a part in the regulation of the water and salt balance of the blood, a part in the maintenance of the reaction (pH) of the blood within normal limits, a large part in the excretion of the end products of protein (nitrogenous) metabolism, the excretion of certain substances (threshold bodies), such as certain dyes and toxins, when they appear in the blood at all, and of others (non-threshold bodies), such as glucose, when they reach more than a certain concentration in the blood. It is probable, too, that the kidneys may pass certain kinds of living pathogenic bacteria from the blood into the urine without sustaining any severe or lasting damage.

Experiments on dogs indicate that a normal individual can withstand the loss of three quarters of his renal tissue without developing symptoms or signs of renal insufficiency. The functional capability of the kidneys, in excess of that required merely to sustain life, may thus be considered as a surplus which may be called upon to take care of any unusual stresses that may be put upon them. It is only when this surplus has been largely destroyed and the individual begins to live upon some of the minimum that is absolutely indispensable for life, that the accumulation in the blood of substances normally excreted in the urine causes the individual to become really ill from renal insufficiency and to develop signs and symptoms of uremia.

The gross and microscopic changes presented by the kidneys, as well as the effect on the general metabolism of the patient, and, accordingly, on the nature of the illness that will result from a given loss of renal tissue, will depend, in the main, on the character of the destructive influence and on the intensity and duration of its action. A certain amount of secreting tissue is lost from day to day as a result of the normal processes of metabolism and from such repeated slight injuries as may come from minor intoxications and infections which throw into the blood and onto the kidneys, toxins which, while definitely pathologic in character, are neither sufficiently intense nor long continued in their action to produce clinically recognizable evidences of renal disease. Thus, after a certain number of years of life, which will vary with the individual, with the type of renal equipment he has inherited, and with the kind of a life that he has led, the kidneys will show a loss of reserve function, and, if they happen to be subjected to microscopic examination, may be shown to exhibit changes which have for their main characteristics a diminution of the number of the parenchymatous elements and a replacement of them by fibrous tissue—a slight degree of contracted kidney.

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* Read before the Annual Scientific Assembly of the Society, May 7, 1936.

Kidney tissue may be lost in many and varied ways which may be broadly grouped as mechanical (from direct or indirect trauma or from intrapelvic pressure), as chemical (from bacterial and other poisons), and as infectious if bacterial or other parasites proliferate in the kidney tissues and give rise to specific tissue reactions. Other extrinsic causes of disease, such as extremes of temperature, other than actual burns of the body coverings and of atmospheric pressure, deprivation of nourishment (with the exception of instances of infarction), exhaustion from overwork, electrical discharges, etc., seem to affect the kidney either not at all or only indirectly by toxemia or by their effect on other organs or on metabolism in general.

With mechanical influences, whether accidental or operative, the result will depend not only on the amount of kidney tissue lost and on whether the individual is deprived of all or of only a part of his renal structures, but also on whether the deprivation of renal tissue is brought about suddenly or is drawn out over a relatively long period of time. If all of the individual's renal tissue is lost at once, as may occur in injuries that quickly destroy either both kidneys or a solitary kidney, there may be no untoward symptoms or signs except the anuria, for a week or 10 days, after which weariness, stupor, slight headaches, diarrhea, muscular tremors, hiccoughs and vomiting may develop and the patient sinks into a coma before death, without exhibiting the marked convulsions that are often a striking sign in the insufficiency developing from contracted kidneys. If only one kidney is lost and the other is functionally sufficient, the function of urinary excretion is taken up by the remaining one usually with only slight delay, and, so far as the urinary function is concerned, life goes on in much the same manner as before. In other instances of injury, however, the ureter may be blocked so that the renal pelvis and its various ramifications are distended with urine and the renal tissue above is subjected to sufficient pressure to cause the atrophy of a certain number of its functional elements; if the obstruction is removed after a short time and a free egress of urine again permitted, such loss may be negligible, but, if the obstruction is permanent or if it is repeated at intervals over a sufficiently long time, the entire kidney may be destroyed. The effect of this process on the general metabolism of the individual will depend on whether the process occurs in only one kidney or in both of them. If the obstruction is unilateral, the opposite kidney may show a compensatory hypertrophy which will take care of the body needs, but if the lesion is a bilateral one and is not relieved and infection does not supervene to accelerate or complicate the process the end result will be much the same, if not identical, with that noted in extreme grades of contracted kidney described below.

Chemical substances that act harmfully on the kidney are legion in number, some known and perhaps more unknown, at least insofar as their origin and chemical formula are concerned. They are brought to the kidneys in the blood and usually act on both kidneys at the same time, in the same way and to approximately the same degree. If the kidneys are subjected to the action of a toxin which is intense, the striking clinical picture of nephrosis with its generalized edema, marked albuminuria and normal blood pressure with increased blood chloride and normal blood nitrogen findings results, and the kidneys will show a cloudy swelling which is often only the renal part of a series of similar pathologic changes in other organs; if death occurs from nephrosis, it results no more from the renal insufficiency than from the effects of the poisons on the other vital organs, the heart and blood vessels, liver, nervous system, etc.

If the action of the toxin can be successfully combated and thus is of short duration, as may happen in diphtheria and syphilis, complete recovery of the renal and other tissues may result, but, if it is not readily removed by the treatment available and its action is thus prolonged, as in chronic suppurative disease, or if it is of an unusual character at the onset, as in eclampsia, in some instances of tuberculosis or of idiopathic nephrosis, even though its action is not markedly intense or long drawn out, the clinical picture of acute glomerulonephritis with its edema, albuminuria, increased blood chloride and blood nitrogen findings and arterial hypertension, results. The acute diffuse glomerulonephritis may, in its turn, end in the chronic hypertension or chronic edema of chronic diffuse glomerulonephritis, the dominant feature of the clinical picture depending in a measure on whether the blood vessels or the glomeruli of the kidney are most affected. In either instance the end result is a contracted kidney, a small firm hard organ with a puckered surface, in which the functioning epithelial elements have largely disappeared and have been replaced by fibrous tissue. In the late stages of contracted kidney, headaches, muscular cramps, nausea, and indigestion, associated with increased blood pressure usually give evidence of the disease; the 24-hour amount of urine is increased, the specific gravity becomes low and fixed, albumin is small in amount and hyaline casts are found on microscopic examination; the blood nitrogens are increased, and, later, in the terminal stages, hiccough, vomiting, sudden attacks of blindness, dyspnea and muscular twitchings appear, oliguria and perhaps anuria develop, the blood nitrogens run to very high levels, delirium, convulsions and coma occur, and unless a remission is secured end in death. The sequence of symptoms is not at all an orderly one, since remissions and relapses may occur.

Between the extremes of nephrosis with edema and contracted kidney with high blood pressure, lie a series of mixed and poorly differentiated acute and chronic clinical and pathologic pictures which have led certain authors to classify uremia into various types depending on which organ system the dominant symptom seems to come from, respiratory, cardiac, gastro-intestinal and nervous.

The exact nature of the bodies that are retained in the blood in renal insufficiency is not known, but the clinical onset is almost always associated with an increase in the nonprotein nitrogens of the blood. In many ways true uremia resembles carbolic acid poisoning, and an increase in the blood phenols has been noted in it. It is possible that it may be due to the retention of any one or of a combination of metabolic end- or by-products, or that different retained toxins may be responsible for the different symptoms noted at different times and in different patients.

If bacteria lodge in and proliferate in the renal tissue, they set up a local reaction which is specific within certain limits and which destroys the renal tissue to a greater or lesser degree. The influence of the coincident loss of renal tissue on the general metabolism is by no means as prompt or striking as is that brought about by the infection, and, since renal infections are often mild, slowly progressive, and readily recoverable, no ill results at all may be noted from the renal tissue destroyed. Eventually, however, if the infection happens to be extensive, intense, prolonged or often repeated, enough of the renal structure may be destroyed to cause a uremia that does not differ greatly from that noted in contracted kidney. Except in very rare instances, however, the symptoms and signs of infection predominate over those of renal insufficiency and, unless they are relieved, are the cause of death when it occurs.

PREFRONTAL LOBOTOMY IN AGITATED DEPRESSION*

REPORT OF A CASE

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For many years it has been recognized that euphoria and indifference are prominent symptoms in cases in which there has been severe injury to the frontal lobes, and recently there has been intensive investigation of the alterations in behavior in man and in animals following lesions limited to the prefrontal areas. The studies of Fulton and Jacobsen upon primates have shown that after bilateral prefrontal lobectomy, the animals could no longer be brought into a neurotic condition when repeatedly given problems too difficult for them to solve. Furthermore, the studies of Brickner and of Ackerly upon lobectomized men have shown that a considerable portion of the prefrontal areas can be removed without lowering the general intellectual level, although certain rather characteristic alterations in behavior are noted.

It remained to Moniz to operate upon the prefrontal areas in psychotic individuals with the idea of breaking up certain abnormal patterns of cerebral cortical activity. Moniz argued that while there are no detectable abnormalities of the brain in certain of the "functional" psychoses, the symptoms might be due to the formation of certain synapses in the cortical association centers that would become fixed in pattern and, therefore, would tend to perpetuate themselves to the detriment of the personality as a whole. By forcibly breaking up the synapses over a large area an opportunity would be given for reintegration of cortical activity along different lines. In his monograph published early this year Moniz reported his first 20 cases, and in a personal communication he states that he has operated upon 20 more. No patient died, and none was made worse. The best results were obtained in agitated depression, in which condition 5 out of 6 patients were cured and the other improved. The worst results were obtained in cases of dementia praecox, 2 being somewhat benefited, and 5 remaining unchanged. The protocols are given in detail in this well-documented study. Moniz began his experiments in November, 1935, at first using injections of small quantities of absolute alcohol in various parts of the prefrontal white matter on both sides, but more recently he has been using an instrument called a leucotome. The leucotome, which is an instrument about the size and shape of a brain cannula used in puncturing the ventricles, is inserted into the frontal lobe. Pressure upon the stylet causes a loop to be formed near the distal end of the cannula. By rotating the loop a small "core" of white matter is cut. The operation is performed through a burr hole and no serious reaction or disturbance of function has been noted. The immediate result in almost every case reported by Moniz has been cessation of the psychomotor restlessness, agitation and anxiety that characterized his patients.

Report of Case

History.—A. H., a white female, aged 63 years, complained of nervousness, insomnia, depression of spirits and a feeling of anxiety and insecurity. The condition had been developing gradually for a year, following an exhausting automobile trip during which she and her husband got lost at night in the environs of New York City. She was highly keyed up and unable to sleep when they finally arrived in Philadelphia, and had been troubled with sleeping ever since.

Even as a little girl she had been "nervous." She was the youngest of the family; her father spoiled her and she obtained her goal by tantrums and crying. At the age of 16 she suffered from eyestrain and for more than a year was unable to read. She was married in her middle twenties and became pregnant immediately, suffering from marked nausea and depression; she was disturbed at times and almost suicidal. This child died at the age of 2 years, but her other 2 children were born more easily. She was extravagantly careful as a mother, wearing out herself and her husband with constant fussing about the children. During the war, because of financial stringency, she was forced to keep house for a crotchety uncle and adapted herself very slowly, frequently becoming depressed and tearful. The trouble with the eyes recurred. Another nervous breakdown occurred, and she was incapacitated for a year or more. Twice she had been treated for ulcers of the stomach with prolonged rest, diet, etc., and she was still eating with great care although not suffering at the present time. Never having slept well she had required sedatives at times and for the past 10 years had almost regularly taken 2 or 3 Medinal tablets every night.

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* Read before the Section on Neurology and Psychiatry of the Society, October 1, 1936.

Her husband was mild mannered and sympathetic, not particularly aggressive in business, but a stabilizing influence in her life. The patient was very demanding upon him, worried if he were a few minutes late in coming from the office, and manifested rather extravagant behavior when things did not suit her.

During the months preceding the first interview she had become increasingly despondent and apprehensive, worrying over trifles, turning events over and over in her mind until she felt as though she would "go crazy." She imagined herself in various suicidal situations, although professing that she lacked the courage to go through with the act. She was particularly concerned over an infatuation that had occurred some years ago, was under the compulsion of telling her husband about it, then denied it all and became extremely restless and agitated in consequence of having disclosed this.

She had always been rather vain about her beauty, and could not adapt herself to the idea of growing old and losing her looks. She was distressed about the thinning of her hair. During the period of observation she became increasingly obsessed with the change in her appearance, would pose nude before the mirror and then make faces at herself. Shortly before admission to the hospital she even exposed herself before the window, and urinated upon the floor.

Examination disclosed a middle-aged female, rather thin and flabby, but with a smooth skin and rather thin hair, looking younger than the age given. She was quite apprehensive, demanding to know the result of each test, and inquiring constantly about her health. When she was asked whether she was subject to colds or sore throat, she became agitated, saying: "Why do you want to know? Why did you ask me that? What does that mean? What has that got to do with it?" During the examination she was wringing her hands, moving about in bed and trying to get out. Her voice was high pitched and almost screaming at times. There was some reddening of the conjunctivae; the blood pressure was 158 systolic and 88 diastolic; the liver was palpable; otherwise both general physical and neurological examinations were negative.

Owing to the rapid aggravation of the mental condition of the patient during the month under observation the operation of prefrontal lobotomy was advised, and the consent of both the husband and the patient was secured.

Operation.—On September 14, 1936, under avertin anesthesia supplemented by gas, 2 burr holes were placed 3 cm. from the midline and 3 cm. in front of a perpendicular line through the tragus. The dura and pia were carefully opened and bleeding controlled. The leucotome* was introduced in an anteromedial direction to a distance of 4 cm. The stylet was then pushed in and the needle rotated completely. The needle was withdrawn 1 cm. and a second cut made; and a final cut was made at a depth of 2 cm. The needle was then completely withdrawn and introduced in an antero-external direction to a depth of 4.5 cm. where a cut was made, and 2 other cuts were made at depths of 3.5 and 2.5 cm. A little bleeding occurred as the third anterolateral cut was made in the right prefrontal lobe, and an examination of the needle when withdrawn revealed a small vessel adherent to it, evidently having been avulsed from an approach too near the cortex. The operation, with its 6 different incisions, was then repeated upon the left side.

The patient's condition was good throughout the operation, and at the conclusion the pulse was 96, whereas it had been 104 at the beginning.

Postoperative Course.—Examination immediately following operation disclosed equal, active pupils, no facial asymmetry, very active reflexes in the lower limbs with transient ankle clonus and a negative Babinski sign. Four hours later, as the anesthetic was wearing off, she was not the least bit excited and declared that she felt "much better." By evening she was bright and alert, manifested no apprehension, showed some tendency to perseveration in naming her doctors and nurse, but promptly named her husband and his position, and named various objects in the room, her address, etc.

The following day the patient was propped up in bed, put out her hand and greeted her physician alertly but unconcernedly and continually rolled a paper handkerchief about in her hands, rubbing it about her face and arms as though drying herself. She answered questions correctly, at first in monosyllables, then in more detail:

"Are you content to stay here?"

"Yes."

"Do you have any of your old fears?"

"No."

"What were you afraid of?"

"I don't know; I seem to forget."

"Are you sad?"

"No."

"Are you happy?"

"Yes."

"Do you remember being upset when you came here?"

"Yes; I was quite upset, wasn't I?"

"What was it all about?"

"I don't know; I seem to have forgotten. It doesn't seem important now."

She allowed her husband to leave the room, remaining in perfect composure, although previously his exit would have excited an outburst of anxiety. The anesthetist was introduced, received with courtesy and indifference. Before operation he did not even enter the room on account of the patient's apprehension.

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* Gentile et Cie, Paris.

Improvement was steady during the next few days. The patient was sitting up in bed reading, could discuss the subjects with intelligence and without anxiety. The perseveration and rubbing disappeared; she was eating and sleeping without trouble. She brought up the subject of her infatuation and discussed it with some feeling, but without any of the morbid anxiety that she had previously shown. During this period, however, she had some retention of urine and was finally catheterized on September 19, nearly a liter being obtained. After this she slept better.

The patient had a setback on September 20, becoming quite excited, confused and apprehensive. She was unable to talk connectedly, showing marked perseveration of syllables, and although she could apparently understand what was being said to her, she was unable to express herself. Her expression was more serene, but the rubbing and rolling movements returned.

On September 23 she was again able to speak, the perseveration being quite pronounced, and on September 24 she could count, say the days of the week, etc., with little repetition. She drew crude pictures and labeled them in her own style, again showing perseveration in the letters. She appeared unconcerned.

There was steady improvement during the next few days, with return of normal speech and normal eating and sleeping habits. Vesical control returned and her attitude toward her husband and others returned to a more normal character. She no longer worried over the loss of her hair, and within 10 days was walking naturally and anticipating her return home without eagerness but also without apprehension.

A month after operation the patient asserted that she was no longer inclined to worry, that she could follow out a trend of thought without distraction, that she could enjoy the conversation of a very energetic friend whose company formerly she could scarcely endure without exhaustion, and that she was content to grow old gracefully. She was well dressed, talked in a low natural tone, volunteered relatively little, but upon questioning showed excellent appreciation of her changed condition. Her husband asserts that she is more normal than she has ever been.

Comment

Immediately following operation, and for several days there was remarkable improvement in the patient's condition. The agitation disappeared, while the ability to read with enjoyment and to carry on a coherent conversation returned. The setback which occurred on the sixth postoperative day was probably the result of further degeneration of the prefrontal region due to thrombosis about the area of section. The softening must have been incomplete, and as edema subsided the patient's mental condition returned rapidly toward normal. Whether any permanent residuals of frontal lobe deficit will be manifested is uncertain at the present time, but the agitation and depression that the patient evinced previous to her operation are relieved.

BIBLIOGRAPHY

Ackerly, S.: Instinctive, Emotional and Mental Changes Following Prefrontal Lobe Extirpation. Am. J. Psychiat., 1935, **92**, 717.

Brickner, R. M.: Localization of Functions in the Cerebral Cortex. An Interpretation of Frontal Lobe Function Based Upon the Study of a Case of Partial Bilateral Frontal Lobectomy. Ass. Res. Nerv. & Ment. Dis., Proc., (1932), Baltimore, Williams & Wilkins, 1934, p. 259.

Fulton, J. F., and Jacobsen, C. F.: The Functions of the Frontal Lobes, a Comparative Study in Monkeys, Chimpanzees and Man. Advances in Modern Biology, 1935, **4**, 113.

Moniz, E.: Tentatives opératoires dans le traitement de certaines psychoses. Paris, Masson, 1936.

Artificial Fever Therapy of Gonorrheal Ophthalmia.—Since the introduction of artificial fever therapy in the treatment of gonorrhea and its complications, many excellent therapeutic responses have been reported in the literature. Desjardins, Stuhler and Popp; Simpson, Bierman, and more recently Metz; and Hasler and Spekter, have shown that the destruction of the gonococcus occurs in a high percentage of Neisserian infections of the urethra, fallopian tubes, articular and periarticular tissues, and the eye.

Knowing well the difficulties encountered in the routine treatment of gonorrheal ophthalmia, we desire to report a case successfully treated by pyretotherapy.

Mrs. E. K., aged 28, school teacher, with a negative past history and general physical examination, was first seen by one of us (L. E. G.), on April 21, 1936. Her complaint was an increasingly severe swelling, pain, and discharge of the right eye since April 14, 1936. During this time, she had consulted a physician who treated her as a case of non-specific conjunctivitis by means of mild antiseptics with a resultant increase in pain, swelling, and purulency of discharge.

Smear examinations revealed many Gram-negative intracellular diplococci, and a diagnosis of right gonorrheal ophthalmia was made. . . .

Fever therapy was instituted at this time by means of the heated humidified cabinet previously described.[*] The first session consisted of a maintained body temperature (106–7°F. rectally) for 6 continuous hours. Hourly smears were made during treatment, and these became consistently negative for all organisms within an hour after the desired temperature had been attained.

Within 24 hours following treatment, the orbital swelling had begun to subside, discharge had entirely ceased, and the eye was free of pain. During the ensuing 4 days, smears were made at 4-hour intervals and revealed only occasional pus cells and a few strands of fibrin. No local treatment was administered following fever therapy. It was felt that the infection had been entirely eradicated, but as a measure of safety a second fever session of the same duration was given. Following this, occurred a rapid resolution of the entire inflammatory process, and when last examined, on June 25, perception for light, color, and large objects had returned. The anterior chamber was clear, and the corneal ulcer had almost completely healed.

Summary. A case of gonorrheal ophthalmia which had proved entirely refractory to usual methods of treatment was cured in 2 artificial fever sessions.

Extract from case report by J. M. Berris, M.D., M.K. Newman, M.D., and L. E. Grant, M.D., Detroit, Michigan, *Journal, Michigan State Medical Society, November, 1936, p. 708.*

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[*] Berris, J. M.: Artificial Fever; Preliminary Report of Twenty Cases. J. Michigan M. Soc., 1933, 32, 355.

THE VALUE OF "A COMPLETE CHANGE OF SCENE" FOR THE NERVOUS PATIENT*

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How often the patient who comes to the doctor's office complaining of nervousness in one form or another is speedily and superficially examined and then given the advice, "All you need is a complete change of scene." How appealing the phrase may be—"a complete change of scene!" For the poor, it may mean merely going to the house of a relative to stay for a few days (a not very complete change at that), but to the more fortunate it may betoken anything from a short trip to Atlantic City to an around-the-world voyage in a luxurious steamship. This phrase is tossed off so glibly to those patients who, in the current medical language, "have nothing wrong with them on the physical side." "Well, what of it?", you may ask. "Doesn't it work; isn't it good advice?" Yes, undoubtedly it works and is good advice in some few cases, but to use this formula indiscriminately for all sorts and types of nervous patients not only fails to do justice to the patient, but may be exactly the wrong thing to do. My purpose in this paper is to inquire into the usefulness of this type of advice, its limitations and its contraindications.

What called my attention to the subject was a series of patients whom I saw within a comparatively short time, to all of whom this advice had been given and not very wisely, as it turned out. It will, therefore, be advantageous to cite 4 of these cases, and from them we can deduce some of the contraindications.

The first case was that of a woman 57 years old who lived in New York and whose son had recently been indicted for fraudulent dealings in stocks. During the time he was awaiting trial the patient entered into a depression. Certainly it is easy enough to understand how the son's situation could bring about such a reaction in a very conscientious and thoroughly honest woman. She had trouble sleeping, lost her appetite, found her energy at a low ebb, had difficulty in concentrating, and began to think that she was to blame for her son's defalcations. After this state of affairs had lasted a couple of weeks, the family physician was called in. According to the husband, he spent about 10 or 15 minutes with the patient and then told the husband that what she needed was a complete change of scene. She had a married daughter living in Washington, and it was decided by the doctor and family that coming here would provide her with that change of scene which would "snap her out of it." It was freely predicted by the physician, according to the husband's statement, that if the patient were brought here a change in her would be apparent very soon. The physician's last statement was entirely correct; a change was seen but not exactly what he had expected. The patient and her husband came here and up to the time of their arrival she had eaten fairly well in spite of her poor appetite, and had also managed to remain up and about during the day. Immediately upon arriving here, however, she went to bed and remained there. She did not even notice her attractive little granddaughter of whom she was very fond and who was supposed to be one of the factors in giving her grandmother a complete change of scene. In addition to remaining in bed, she refused food except for taking 1 or 2 cups of coffee. When she was seen 4 days after her arrival, she presented a picture of a very acutely depressed individual with marked slowing up of speech and with pronounced suicidal ideas. She saw absolutely no hope for herself and welcomed the idea of death. She told me that coming to her daughter's house had made her feel much worse. The need for treatment in a mental hospital was obvious and the family was advised to take her back to New York as soon as possible; in the meantime to have her put under suicidal observation. I am glad to say that the daughter reported soon afterwards that her mother had been taken back and had been put in a nearby hospital for mental disorders.

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* Read before the Annual Scientific Assembly of the Society, May 7, 1936.

The second case which I wish to cite is that of a 30-year old married social worker who lived in Kansas City. One night she telephoned her brother in Washington and told him that people were tampering with her mail and writing defamatory letters about her. She also told him that she thought the telephone wires were being tapped during their conversation. The brother wrote to the patient's husband and told of this telephone talk. She was then taken by her husband to a physician, and in the presence of her husband she told the physician of the various abuses to which she had been subjected. The latter gave her a speedy examination and said, "There's nothing the matter with you physically. All you need for these ideas is a complete change of scene. Why don't you go and visit your brother in Washington for a little while?" Arrangements were made and the patient left home in a good frame of mind. When she was met by her brother and the latter's wife they noticed what they called a "queer look" in her eyes and heard her complain that there had been a dictaphone in the next car taking down her thoughts all the way from Kansas City. When they tried to talk to her in the evening she became unfriendly, secluded herself in her room and read Christian Science until 4 o'clock in the morning. The relatives, naturally enough, became alarmed and the next day took measures to see what was the matter with the patient.

When the patient was seen she presented a picture of suspiciousness combined with evasiveness and much silly grinning. She said that she could hear voices at a great distance with her right ear and that she had stopped reading Christian Science at 4 o'clock only because she had heard a tapping on the wall which she had interpreted as a command to stop. This was such an obvious case of dementia praecox that one cannot help being surprised at the advice given. Here again we see this phrase glibly tossed off when a little more care in examining would have shown the unwisdom of it. As in the first case arrangements were made for her speedy return and hospitalization.

The third case which I wish to cite is that of a 25-year old man who for some time had suffered from panicky feelings. These occurred particularly when he went to the movies or other places where crowds of people congregated. In spite of these feelings he had been able to stay at his work and to lead a fairly normal life. Without consulting a physician this patient and his family decided that the best thing for him was to have a complete change of scene. When physicians prescribe this form of treatment so commonly and indiscriminately it is not to be wondered at that the layman often takes matters into his own hands. Thereupon the patient betook himself to a sanitarium where great emphasis was laid on abstinence from tobacco and on particular varieties of diet. I regret to state that the psychological setting in which his panics had developed was entirely ignored, and instead he was placed on a faddistic diet and told to abstain from smoking. It was explained to the patient that his panics had been caused by eating improperly and by excessive smoking, although he smoked less than a pack of cigarettes a day. In a week or so the patient's symptoms were much worse, nevertheless he remained at the hospital several weeks longer. When at the end of this time no improvement was apparent, he left, but his recovery was very much retarded by his profound conviction that improper diet and "nicotine poisoning" had been the cause of his panics. As a matter of fact, in this case, certain financial and family situations were clearly the causes, and when these were straightened out the panics disappeared.

The fourth and last case is that of a 32-year old man, who was of a rather rigid and strait-laced make-up and who had recently indulged in extramarital relations for the first time and had become rather conscience-stricken. A few weeks later when he was down-town with his wife he accidentally encountered the young woman who had been his paramour. One can readily understand his fear and trembling in such a situation, and a day or two later the same set of bodily symptoms—that is, fear, as expressed by rapid heart beat, breathlessness and a feeling of faintness as well as trembling, sweating and other signs of sympathetic stimulation—occurred. He noticed that this anxiety syndrome occurred particularly when he went places by himself, whereas he felt perfectly well at home. He consulted a physician, but unfortunately, although he described his symptoms to him, he did not reveal their obvious cause. His explanation later was that the physician did not give him time but told him that he had a "nervous heart" and added that there was nothing organically wrong with that organ. Once more the same formula was used that had been mentioned in these other cases. This patient was well fixed financially and decided to go to Florida in his car a few days later. The first night in the hotel in North Carolina the patient had a recurrence of the anxiety attack and felt sure that his end had come. It was necessary to give him morphine to quiet him, and the next morning, instead of proceeding to Florida, he returned home. The outcome of this case has not been reached yet, but it is cited to show the folly of advising a complete change to a patient whose anxiety state came on when he was away from home and who, as I mentioned, was well while in his own home.

As you can see, I have taken up several typical cases which I feel will enable us to deduce the chief contraindications. In the first place, I feel very strongly that patients with depressive trends, such as the first patient had, should always be very carefully interrogated as to the possibility of suicide. I realize that you have all heard this before, but I feel that it is something, nevertheless, that is frequently overlooked, or even shied away from by the physician in the belief that such interrogation will suggest suicide to the patient. In fact, I feel that in the presence of marked depression one can always assume suicidal ideas. Therefore, when we encounter a patient with depressive trends, if we are to make a complete change of scene, we should see to it that the patient goes to a place where, first, he will be safeguarded from his suicidal ideas, and second, where he can be well taken care of should other complications arise. An aggravation of symptoms often occurs when the patient has made the change and then wakes up to find that it does not produce the marvelous improvement which he had been led to expect.

In the second place, patients who present frank psychotic symptoms, I believe, are not benefited merely by changing the scene. After all, distorted beliefs and delusional ideas cannot be cured merely by transporting the patient from one place to another—"geographical psychotherapy" as one of my friends named it. It hardly seems worth while to labor a point as obvious as this one or to emphasize the necessity for placing such patients under psychiatric care, and in most instances in institutions where some constructive measures can be used. What I wish to bring out particularly in the last two cases is the undesirability of treating anxiety neuroses by change of scene. And anxiety neuroses are surely among the most frequent and curable "nervous" conditions seen by physicians. As we saw in the first of these two cases the patient's symptoms were increased by injudicious medical advice, based on the belief that a personality can be changed by diet and on a moralistic approach to the question of smoking. In the last case we see what may happen when the patient is taken away from the surroundings in which he feels most composed. Before one advises a complete change of scene he should certainly see to it that the patient is going to a place where he will be benefited and reconstructed and not harmed. This, of course, presupposes a knowledge of the patient's total situation—physical, psychological, marital, financial and so on.

Having disposed of some of the contraindications, let us inquire briefly into the type of patient who is benefited by this advice. I believe that some rather mild types of nervousness can be so benefited. Under this heading I would place the patients one frequently sees who have overworked or worked under trying circumstances for a long period of time. Many of these patients complain of mild nervous symptoms, such as increased tension, headaches, slight difficulty in concentrating, irritability or fatigability. Closely related to this group are the patients who have been justifiably worrying about one or many things but who are not depressed to any extent. That other circumstances, too, may warrant this advice is readily conceivable, but I have not tried to cover them all in this paper.

To recapitulate, then, a complete change of scene should not be the sole advice given patients presenting depression, frank psychotic symptoms, or anxiety states; it may be advised mainly in mild nervous cases, but the patient's total situation must always be evaluated and due consideration must be given to the manner in which the patient will spend his time while enjoying this complete change of scene. Need I state in conclusion that, on the whole and at best, I believe a complete change of scene is a greatly overrated therapeutic procedure?

BASIC CLINICAL FACTORS IN EVALUATING TREATMENT AND PROGNOSIS IN HYPERTHYROIDISM*

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The medical history of goiter is an interesting one and dates back to an early age in medical literature. It has a fascinating background, and the present day low mortality rates give just tribute to American medicine and surgery. Boothby writes: "According to Garrison, Actius of Amida who lived in the era of Justinian I (527–560), wrote an interesting chapter on goiter. Roger of Palermo in his 'Practica,' which was written about 1170 and was the chief textbook at the School of Salerno, prescribed ashes of sponge and seaweed (rich in iodine) for the treatment of goiter or scrofula. Paracelsus (1493–1541) was the first to establish a correlation between cretinism and endemic goiter. The use of iodine as such in the treatment of goiter was first studied and recommended by Coindet in 1820. The syndrome now recognized as hyperthyroidism, usually associated with exophthalmos, was described by Parry in 1786, by Flajani in 1800, by Graves in 1835, and by von Basedow in 1840." The first operation on the thyroid gland was performed by Kocher of Bern in 1872. In 1874 he reported 13 thyroidectomies with 2 deaths. The first thyroidectomy on a patient with Basedow's disease was performed by Rehn in 1880. The patient when presented 3 years later before the Medical Society at Frankfort was completely cured. A review of the literature in 1900 by Rehn presented an operative mortality rate varying from 11.4 per cent to 22 per cent.

In May, 1923, Plummer, before the Association of American Physicians, presented his report on the prevention of the crisis causing death in exophthalmic goiter following the administration of iodine. The administration of 10 drops 3 times a day of the compound solution of iodine (U. S. P.) was begun early in March, 1922, to patients with exophthalmic goiter who were admitted to the Mayo Clinic and continued for some time after operation.

Boothby in July, 1935, published an excellent and comprehensive survey of disease of the thyroid gland, subtitled "An Interpretative Review of Progress Toward Solution of the Problem." To quote from his opening sentences:

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* Read before the Annual Scientific Assembly of the Society, May 6, 1936.

"Billroth in 1869 had performed partial thyroidectomy for goiter in 20 cases with 8 deaths (40 per cent), and he stated: 'To him who has had little practice in these operations it can easily happen that he removes the entire half of the gland instead of merely the tumor (enucleation), whereby the operation becomes very complicated and most dangerous.' " He makes the statement that the surgical mortality in this disease has been reduced to around 1 per cent in many large clinics in which operation on the thyroid gland is extensively carried out and to even less than that figure in a few clinics.

Pemberton, Haines, Crile, and Lahey have presented the most extensive reviews of the results of thyroidectomies in this country. To their work we might well dedicate the following lines from Kipling:

> "Light your pipe and have a look among your files,
> You've a better chance to guess
> At the meanings of success,
> When you've seen in perspective in the files."

In 1934 Pemberton, and Pemberton and Haines, reported the operative mortality on 37,228 patients at the Mayo Clinic on whom 45,824 operations were performed since 1918. Of these patients 15,973 were operated on for exophthalmic goiter and 21,255 for adenomatous goiter. One of the most significant facts brought out in their report was the reduction of mortality for patients with exophthalmic goiter to almost one quarter of what it had been before. Other important facts which this brings out are the increase in the operability of the patient with exophthalmic goiter following the administration of iodine in almost doing away with the necessity of 1 to 4 ligations before subtotal thyroidectomy as was previously practiced, and the tremendous economic saving to the patient in almost eliminating the interim mortality and reducing to a very minimum the number of patients admitted with cerebral or gastro-intestinal crises.

Iodine has played the major rôle in the reduction of operative mortality, but many refinements in surgical technic have contributed to this reduction. Mortality statistics have been lowered by the introduction of the use of oxygen in postoperative pneumonia; the use of calcium, cod liver oil and parathyroid extracts following unintentional parathyroid extirpation; the use of insulin in diabetes; and the more intelligent and adequate usage of digitalis in congestive heart failure and auricular fibrillation.

Crile in 1930 reported that he and his associates had performed on September 9, 1929, their twenty-thousandth operation on the thyroid gland. Of these operations 13,814 were thyroidectomies, 10,125 of which were for hyperthyroidism and 3,689 for simple goiter. Five thousand three hundred and fifty-four were ligations. In one series of 982 operations in patients under 50 years of age, Crile had a zero operative mortality. For all operations he reported 0.5 per cent mortality which embraced his principle of anoci-association of stealing the gland and of multiple operations.

Lahey in 1934 reported 4,298 cases of primary hyperthyroidism and toxic adenoma embracing 5,575 operations with a mortality percentage for patients of 0.86 per cent and an operative mortality for operations of 0.66 per cent.

Boothby has the following comments to make regarding medical treatment and roentgen therapy: "In 1918 McCarrison collected all the available data and concluded that with rest and ordinary medical attention it may be reasonably expected that at least 50 per cent of all patients will eventually recover to the extent of being capable of fulfilling their daily duties more or less efficiently. Thus, of 3,523 patients so treated whose cases he was able to find records of in the literature, recovery was stated to have occurred in just over 50 per cent; in 39 per cent the condition had been alleviated or had become chronic, whereas death had resulted from the disease itself in 12 per cent. In fatal cases, death usually occurred within a period of 6 months to 6 years after the onset; in more than 50 per cent it occurred within 18 months. . . . Even if all the claims made by the advocates of roentgen therapy are granted, the results are so inferior to those obtained by partial thyroidectomy in conjunction with the proper use of iodine that space need not be taken here to present the facts in detail."

It is universally recognized that the administration of iodine by mouth will result in most cases in an abrupt remission of the disease, often as abrupt and complete as following subtotal thyroidectomy, that iodine alone is not sufficient to permanently cure the disease and that in some cases of exophthalmic goiter it has no appreciable or no observable effect. It has been shown by Thompson, Brailey, Thompson and Thorp that as little as 1 minim of compound solution of iodine a day would produce a desired effect.

The institution of therapy in any clinical syndrome demands a properly evaluated history, physical examination and such laboratory observations as are indicated. In the study of hyperthyroidism there are certain basic clinical factors that must be observed and evaluated before instituting treatment and estimating prognosis. These factors are duration of the disease, basal pulse rate, the initial basal metabolic determination, the age of the patient, the gain or loss of weight under treatment, the mental attitude of the patient, the presence or absence of cardiac irregularities or congestive heart failure, and the basal metabolic rate determined after medical treatment and just before surgical treatment is instituted.

The following chart presents the relative values of these factors and gives a rough rating scheme as to the patient's relative operative risk:

	Rating
1. Duration of disease (not over 1 year)	1
2. Basal pulse on admission (not over 110 per minute)	1
3. Basal metabolic rate on admission (not over plus—50 per cent)	1
4. Age of patient (not over 35 years)	1
5. Gain in weight under treatment	1
6. Mental attitude of the patient, i.e., no undue apprehension	1
7. No cardiac irregularities or evidence of congestive heart failure	3
8. Preoperative basal metabolic rate (not over plus—30 per cent)	1
Total	10

A rating of 7 is graded a good; 5 to 6, a fair; below 5, a poor operative risk.

Goodwin, writing in the Medical Clinics of North America, March, 1934, says: "Prompt and permanent restitution of health is the ideal of any successful treatment. The intensity of the subjective symptoms in hyperthyroidism in the great majority of cases varies directly with the degree of elevation of the basal metabolic rate. The introduction of methods for easily estimating the metabolic rate has supplied an objective criterion by which the results of treatment may be judged and various methods of treatment compared. According to this reliable criterion surgery has proved itself the best treatment now available in the treatment of hyperthyroidism." In a careful follow-up study of 132 patients operated on from 1 to 4 years previously, he and his associates believe that the patient has an 83 per cent chance of prompt restoration of health following surgical therapy. Their experience with radiotherapy was limited at that time to 21 cases, and the conclusion is drawn that X-ray therapy is of value in mild cases kept under frequent observation and in those postoperative cases in which there is a continued mild toxemia. The average time for restitution of the basal metabolic rate to normal levels under radiotherapy in their cases was 1 year. Smith, writing in the Surgical Clinics of North America, April, 1934, reaches the conclusion after a careful follow-up study of 50 patients operated on that the existence of a normal metabolic rate for 1 or 2 weeks after operation in a patient who has been receiving iodine is not a reliable criterion of a permanently satisfactory result. He believes for practical purposes that a plus-20 per cent is a fair upper limit of normal. Repeated readings above plus-20 per cent would indicate a continuance of the toxemia, though the diagnosis should be confirmed by the presence of clinical evidence of the disease. The above rating chart has been devised and used by Drs. Smith and Goodwin in evaluating medical treatment and the surgical outlook preoperatively.

Prognosis in any disease depends upon a knowledge of its natural course and the extent to which this can be altered by treatment.

Toxic goiter runs a variable course, and the personal and environmental conditions of the individual patient contribute to the course and the possibilities of treatment. Acute infections, mental strains and worries are so frequently associated with the onset and relapses that they must be considered contributory etiological factors. Treatment then resolves itself into rest, removal of these factors, and the diminution of the amount of actively functioning thyroid gland tissue.

SUMMARY

A brief history of the progress in the treatment of hyperthyroidism is outlined. The fundamental clinical observations that must be made before instituting treatment and their basic value in determining prognosis are discussed and presented in the form of a "rating chart."

BIBLIOGRAPHY

BOOTHBY, W. M.: Disease of the Thyroid Gland; an Interpretative Review of Progress Toward Solution of the Problem. Arch. Int. Med., 1935, **56**, 136.

CRILE, G. W.: Clinical Analysis of 20,000 Operations on the Thyroid Gland; with Special Reference to End Results. Proc. Internat. Assemb. Inter-State Post-Grad. M. A., North America (1929), 1930, **5**, 392.

GOODWIN, G. M.: The Treatment of Hyperthyroidism. M. Clin. North America, 1934, **17**, 1,171.

KOCHER, T.: Zur Pathologie und Therapie des Kropfes. Deutsche Ztschr. f. Chir., 1873–74, **4**, 417.

LAHEY, F. H.: Thyroid Disease. New England J. Med., 1934, **210**, 1,016.

MCCARRISON, R.: The Thyroid Gland in Health and Disease. New York, Wood, 1918.

PEMBERTON, J. DE J.: The Rational Treatment of Hyperthyroidism. South. M. J., 1934, **27**, 323.

PEMBERTON, J. DE J., AND HAINES, S. F.: Hyperfunction of the Thyroid Gland; Recent Developments in Clinical Recognition and Surgical Treatment. Am. J. Surg., 1934, **23**, 399.

PLUMMER, W. A.: Clinical Features of Thyroid Disease. Ann. Clin. Med., 1922–23, **1**, 259.

REHN, L.: Die chirurgische Behandlung des Morbus Basedow. Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1900, **7**, 165.

REHN, L.: Ueber die Extirpation des Kropfs bei Morbus Basedowii. Berl. klin. Wchnschr., 1884, **21**, 163.

SMITH, M. K.: The Results of Operation for Hyperthyroidism from the Standpoint of the Basal Metabolism. S. Clin. North America, 1934, **14**, 481.

THOMPSON, W. O., BRAILEY, A. G., THOMPSON, P. K., AND THORP, E. G.: The Range of Effective Iodine Dosage in Exophthalmic Goiter; the Effect on Basal Metabolism of Rest and of the Daily Administration of One Drop of Compound Solution of Iodine. Arch. Int. Med., 1930, **45**, 261.

The Overcrowding of the Medical Profession.—One of the most important problems now confronting the medical *profession* of this country is the overcrowding of the profession This overcrowding is so great that it has become a menace both to the profession and to the public. It is a menace to the profession in that due, in part, at least, to this overcrowding it is difficult for a large number of medical men to make a living. It is a menace to the public in that the fierce competition has had a tendency to commercialize the profession and lower the standards of medical ethics and medical practice. . . .

The present Association of American Medical Colleges was organized in 1890. After the creation of the Council on Medical Education in 1904, the Association of American Medical Colleges has played a very important part in the re-organization of medical education in this country. As the number of medical colleges was gradually reduced from 160 to about 80, the Association of American Medical Colleges accepted as members of the Association only the better schools—the schools that were recognized as acceptable and qualified to teach medicine properly. It became more and more, year after year, a very important factor in the campaign for improving the standards of medical education.

In 1926, the Association began the publication of a Bulletin and this became the Journal in 1929. It is published bimonthly and has a large circulation in the United States and Canada and is also sent to some European countries. The Association has a complete record of all applicants and all applications of students beginning the study of medicine, of their accomplishment in medical schools year by year, and many other valuable records which are accessible to all of the medical colleges and state boards, and have proven to be of great service in the selection of students. . . .

There are in the United States 165,000 medical practitioners. This is about 1 licensed practitioner of medicine to 760 people, being the largest percentage found in any country of the world. With the increase of means of communication and of transportation and the increased number of hospitals, it is safe to say that on an average 1 medical practitioner can provide adequate medical care for from 1,000 to 1,200 people; since the depression, beginning in 1929, a large percentage of the physicians of the country, possibly from 40 to 50 per cent, are not able to make a fair living and support and educate their families and put aside something for old age. This struggle for existence (and this fact cannot be emphasized too strongly (has definitely tended to commercialize the practice of medicine and lower the ethical standards of practice.

Medicine is a profession. It differs sharply from most commercial pursuits. Medicine requires not only a proper scientific training but also certain other qualifications which are equally essential. The physician and surgeon is often the court of last resort; the life and health of the patient is often in his hands. The physician must cultivate and acquire the judicial attitude, the judicial quality of mind, in order that he may decide properly the important questions that confront him. Above all, the physician must be a man of character. He must in his life and professional work accept a high code of ethics which controls all of his actions. He must always and at all times be governed by the code of ethics and practice the Golden Rule. He must not commercialize his profession. . . .

. . . We must elevate the standards of requirements demanded to secure a medical education and a license to practice medicine. This should not mean an increase in the length of the medical course but a decrease in the number of medical students by an increase in the educational standards and the standards of personal fitness. . . .

Conclusions.—1. Investigation has shown that there is a great and increasing overcrowding of the medical profession and that this has become a menace both to the profession and to the public.

2. This condition can be relieved by reducing the number of students entering our medical schools and the number who are licensed by state boards.

3. This reduction can best be accomplished by having the medical schools reduce the number of students accepted to the numbers which they have facilities to care for properly.

4. The medical schools and the state boards should make their standards of requirements for graduation and licensure, from the standpoint of scholarship and character and general fitness to practice medicine, so high that they will eliminate the 10 per cent or more of the poorest and least desirable men who are now entering the profession.

5. In the present overcrowded condition no group should be permitted to enter medicine in such numbers as to crowd out of medicine the members of other groups who desire to enter. No group should be discriminated against. The members of all groups must have the same rights and opportunities.

6. The program which would correct this situation might be briefly summarized as follows:

The medical schools and the State Boards should unite in an effort to prevent any further increase in the overcrowding of the medical profession. Instead of admitting each year 6,000 or more men to the profession, as they are doing at present, admit no more than about 4,000, the number removed by death and retirement. It will take several years to bring about this balance. This plan is now in operation in some of the Scandinavian countries, and has proven to be a success. It, obviously, will be necessary to establish such a balance before any serious effort is made to reduce the present proportion of practitioners of medicine to the population of the country which is, as has already been pointed out, 1 practitioner to 760 people, the largest percentage found in any country in the world.

The dangers of overcrowding the medical profession should be presented fully and fairly with the hope of creating a public opinion which may be of service in correcting this condition.

Extract from article by ARTHUR DEAN BEVAN, M.D., Chicago, Illinois, *Journal of the Association of American Medical Colleges, November 1936, p. 377.*

CONSTITUTIONAL FACTORS IN MENTAL DISORDERS* †

(*Continued from October, 1936*)

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ENDOCRINE CONSTITUTION

The investigation of the various personality reaction types as regards their organic constitution, the size of the various organs of the body, has not yet been completed. There is enough information, however, to exclude the size of the brain as of any importance in the type of the psychosis. Moreover, the heart, an organ that was thought by Lewis to be preternaturally small in dementia praecox, has been shown by more careful statistical methods to be about equivalent in all types of mental reaction, due allowance being made for age, sex, and bodyweight. Information concerning the peripheral vascular organization is highly desirable, as well as the constitutional peculiarities in the stomach, intestines, liver and kidneys, but this must wait for future investigations.

The most promising method of approach from the visceral standpoint to an understanding of the personality seemed to be through the endocrine system. There are many complications to this problem. Involution, senescence and minor pathologic changes may prevent any estimate of the functional capacity of the gland under investigation. The gross measurements can hardly take into consideration the component parts existing in most of the endocrines, and the histologic details are so variable that false deductions may be drawn. Nevertheless, if, in such an investigation, it could be determined that certain glands were significantly larger in individuals presenting a certain type of mental reaction, attention should be focused upon further biologic investigation of these glands.

The field of endocrinology has been a fertile one for those who would thus explain mental abnormalities. Certainly there are examples of psychoses associated with abnormality of one or another of the endocrine glands. The only one worthy of consideration, however, is the common concurrence of schizophrenic symptoms with underactivity of the thyroid, and their clearing up when the deficiency is rectified. Nevertheless, schizophrenia occurs without demonstrable thyroid deficiency in six times as many cases, and in such cases, thyroid medication aggravates the mental abnormality. Moreover, a large proportion of patients with known thyroid deficiency show none of the schizophrenic mental aberrations. It remains to be shown whether any other glandular disturbances are similarly connected with mental deviations. This division of constitutional investigation depends upon the isolation, biological assay, quantitative determination in the circulation, and effects of substitution therapy, of the various endocrine products.

In this particular study I selected from the material cases showing the most marked deviations in the weight of the individual endocrine glands with the possibility in mind that there might be a general personality resemblance, among those possessing, say, large normal thyroids which might be contrasted with the characteristics of a group showing small thyroids.‡ The dangers of too implicit reliance upon postmortem data cannot be too frequently reiterated. Nevertheless, until the time comes when clinical assay of active endocrine principles in the circulating blood becomes possible, the method of pathologic anatomy must receive due consideration. Too many patients with out-spoken diabetes have been found to possess an abundance of normal islet tissue, and too many patients with sclerosis and hyalinization of the islets of Langerhans have been innocent of glycosuria to make it axiomatic that diabetes mellitus is a disease of the pancreas. In all probability there are large factors of safety in each endocrine organ, and also, as has been abundantly proven, interrelationships among the glands that balance one against the other.

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* Chairman's Address, read before the Section on Neurology and Psychiatry, May 28, 1936.

† This address appears in two instalments, of which this is the second and last.

‡ A more scientific study of the problem has recently been completed by Pearl, Gooch and Freeman, aided by a grant from the Macy Foundation. It appears in Human Biology, September and December, 1935.

While it is now possible, on the basis of structural and biochemical studies to identify disturbances in a number of the endocrine glands, personality studies are in their hypertrophic infancy. There is a school of thought today, which, in the quaint words of Benjamin Franklin concerning the medical school in Edinburgh, "seems better calculated to please the fancy than to form the Judgement, and, indeed, the many extraordinary Novelties incullcated there would be a Barr to public Confidence in this part of the World." The Italian school of constitutional pathologists probably started this trend of thought, but, like many another imported plague, the idea became pandemic, and reached its acme in Berman's book, "The Glands Regulating Personality." At the present time, however, the antivirus of common sense, aided by truly scientific researches, has brought about a better balance, so that Hoskins can write: "To those who, in the present state of our knowledge, would glibly rewrite physiology and psychology in terms of pituitary functions, the timorousness of the proverbial angel is commended."

In the study of the personality records of those with large as against those with small endocrine organs, both individually and collectively, it was found that the differences were too small to be taken at face value. It is true that the hypophysis, thyroid and testes tended to be larger in the cycloid group, but, as individuals, these were the patients with the largest bodies and best nutrition, and I had previously shown that these glands are quite susceptible to alterations in the nutrition of the body. The outstanding feature was the persistent thymus in association with the epileptoid personality. Does this mean that the thymus determines the epileptoid personality? There appears to be some disturbance of the general bodily development in a fairly large number of those presenting persistent thymus glands, a softness and rounding of the contours indicating possibly a positive water balance. On the other hand, the thymus is known to undergo rapid involution in response to various unfavorable conditions such as infections and especially wasting diseases. Most of the epileptoids die rather rapidly when their time arrives, and as a group they are younger. Therefore, while the association of persistent thymus and the epileptoid reaction is a pronounced one, it would be hazardous to state that epilepsy is due to persistence of the thymus gland.

The relatively slight relationship, on the whole, between the condition of the individual endocrine glands and the fundamental personality make-up of the individual possessing them has been emphasized by Curschmann as follows: "In spite of marked psychic sluggishness the premorbid psychic personality is always and even strongly preserved in severe myxedema." Furthermore, Engelbach states: "One of the most common reactions attributable to the nervous system [in endocrine diseases] is that of general exhaustion and incapacity, which can be related to nearly all of the ductless glands." Finally, forecasting the results of this endocrine study, I stated: "The study of the constitution will reveal the slight part played by the endocrine glands as such (with the exception of the thyroid) in the development and direction of the psychoses, and the dominant position of these glands in the ordering of bodily growth and form."

Experiments upon animals and operations upon human beings serve to corroborate the conclusions I am obliged to draw from this study of the endocrines in relation to mental reaction. Castration in either male or female does not alter the fundamental personality of the individual, turn him from a cycloid temperament to a schizoid one or vice versa. Nor does excision of the thyroid gland, nor destruction of the hypophysis by disease. The patient with Addison's disease may present certain peculiarities of behavior that stamp him as different from his fellows, but given even as small a number as 20 patients with Addison's disease it is fairly certain that all the personality types enumerated above will be found among them. The question of personality lies deeper in the mists of genetic constitution than the endocrine system.

Two important functions, so far as the personality is concerned, may safely be granted the endocrine system. These are emotional stability and energy drive. The irritability and emotional instability seen in hyperthyroidism, in hypoparathyroidism, in hyperinsulinism and in certain other endocrinopathies are relieved by restoring the normal endocrine balance. The energy drive is reduced in cases presenting any deficiency of the hypophysis, thyroid, suprarenals or gonads. In the cases studied, there was a rather high correlation between unusually small glands of this category, and the failure of personality differentiation, so that in a number of instances the patient could not be said to belong to any of the four personality classes mentioned above. It would seem, therefore, that the endocrines supplied a certain energy drive that enabled the personality of the individual to develop and unfold. So far as determining whether an individual shall be a proud, sensitive, suspicious paranoid individual or a timid, shut-in, dreamy schizoid person, a boisterous, jolly hail-fellow-well-met cycloid, or a moody, pedantic, egocentric epileptoid individual, the endocrine glands would seem to have little say in the matter.

CHEMICAL CONSTITUTION

In the previous section enough evidence has been produced to eliminate the endocrine system as the prime contender for the master position in controlling the personality. Furthermore, at least from the structural standpoint, no one of the other discrete organs of the body has come forward to lay claim to this distinction, except the brain. In the case of the brain, however, anatomic and pathologic study have given little assistance in determining the causes of dementia praecox, manic-depressive psychosis, paranoia and so-called idiopathic epilepsy.

It is necessary, therefore, to delve more deeply into the chemical and metabolic features that differentiate the psychoses from one another.

Several years ago I collected some of these data in a paper entitled "Psychochemistry." In this paper, the known and hypothetical chemical alterations in the brain were particularly emphasized.

The brain is an organ composed of many parts, different in structure and in function, harmoniously integrated into a unit of amazing versatility. Nevertheless, it is still an organ, dependent as any other for its proper functioning on satisfactory conditions of nutrition, oxygenation, hydration, excretion. These major needs, however, comprise many other factors, as yet more obscure, that influence the working of the brain. Among such reaction-systems that fluctuate normally between narrow limits may be mentioned electric potential, oxidation-reduction, aggregation and dispersion, hydration and dehydration, sodium-potassium and calcium-magnesium ratios and hydrogen ion concentration. Too great a shift from equilibrium in any of these systems is certain to be attended by manifestations of disordered function of the brain. Conditions are made more complex, moreover, by the fact that no single system can be thrown out of equilibrium without exerting an effect on one or more different systems, the repercussions of which may lead to generalized disturbances of phasic recurrence and dramatic manifestations. These conditions are worthy of further investigation, since the recognition of the shifts in equilibrium associated with alterations in the functional activity of the brain will be the first step in the search for some method of restoring or maintaining the normal balance.

It has been recognized for years that states of fatigue alone, and of intoxication, result in histological alteration of the cells of the nervous system. If such changes are recognizable by the gross methods that involve complete coagulation and desiccation of the tissue, much more should be determined by the examination of the living tissue, even if the methods are necessarily indirect. Study of the metabolism of the brain is already yielding results of the first magnitude.

We are greatly hampered, however, by our lack of knowledge of the chemistry of the brain itself. We know that the brain is metabolically a very active organ, but it is not yet certain exactly what it feeds upon, so to speak. Oxygen and dextrose are brought to the brain by the carotid artery. The blood in the internal jugular vein contains much less oxygen and dextrose, but more carbon dioxide than does the blood from other accessible veins. Chopped cortical tissue fixes more than its volume of oxygen every hour, and oxygen utilization is doubled by the addition of dextrose. This indicates that cortical tissue has a high rate of metabolism. The dehydrase mechanisms in cerebral cortical tissues are very active, and the cortex also gives a vigorous indophenol-oxydase reaction. Cytochrome, that elusive compound present in every living cell, one which is clearly recognized by means of the spectroscope but has not yet been analyzed, is abundant in the cortex. Glutathione and other compounds containing the sulphydryl radicle are yet to be investigated. Iron and other metallic substances, essential catalysts for the utilization of oxygen, are found in considerable quantities in the cerebral cortex; indeed, iron is found in a concentration equal to that obtaining in red blood cells.

OXIDATION

The effects of known deficiencies in oxygenation of the brain are often striking. The psychic phenomena of circulatory failure, of partial suffocation, of mountain sickness, of carbon monoxide poisoning, are often severe and may dominate the clinical picture. The cardiologist, particularly, is apprehensive when his patients suffering from congestive failure give voice to delusions and hallucinations. These mental phenomena can often be banished abruptly by supplying an abundance of oxygen to the brain. Equally characteristic psychic phenomena may result from a marked increase in the amount of oxygen supplied to the brain. I had the privilege several years ago of entering the pressure chamber at the United States Navy Yard in Washington and experiencing a positive pres-

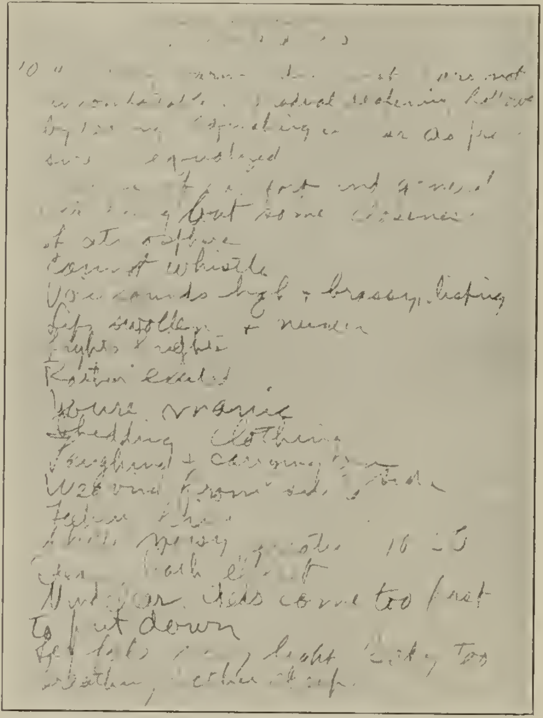
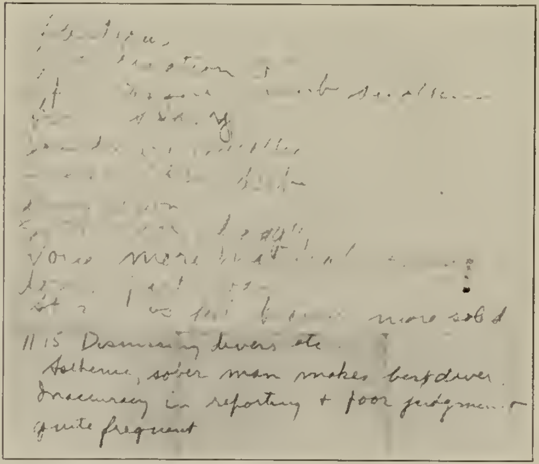


FIG. 12. SPECIMEN OF HANDWRITING OF AUTHOR DURING PRESSURE EXPERIMENT, GOING FROM ATMOSPHERIC PRESSURE TO 90 POUNDS



11 15 Diminishing levers etc
Asthenia, sober man makes best driver
Inaccuracy in reporting + poor judgment
quite frequent

FIG. 13. CONTINUATION OF WRITING (FIG. 12) WHILE PRESSURE WAS BEING REDUCED TO NORMAL

sure of 90 pounds. I have preserved a copy of my notes made at the time (Figs. 12 and 13). The air grew very warm as the pressure increased, and seemed thick, so that when the hand was waved back and forth, a very definite resistance was encountered. At a pressure of 50 pounds a sense of solidity and well-being became manifest, followed by intense euphoria resembling that observed after three cocktails, but without the blurring of vision and sense of unreality that goes with alcoholic intoxication. Voices became loud and metallic, the tendency to laugh was almost irresistible, thoughts flowed too fast to be set down on paper, and the handwriting became a scrawl. I remember but little of the period of maximum pressure except the delight with which I observed the bright lights and the animated expression of my companions. Then, as the pressure was reduced the air chilled and became foggy, the elation died down, and after a number of hours we emerged from the chamber soaked with clammy perspiration and more or less exhausted. Some time later I repeated the experiment going into the chamber with a catatonic patient. Under six atmospheres pressure this patient became hilarious, ceased his jerkings, talked a little and wrote replies to questions. The effect wore off when the pressure was reduced.

Deficiency in the oxidative processes in the nervous system would seem to play an important part in the phenomena of schizophrenia. In some individuals the deficiency would seem to be generalized, and possibly even thyrogenic, since thyroid medication proves curative; but more often the deficiency would seem to be partial, possibly limited to the brain. The effects of such a deficiency are manifested, however, in the general metabolism of the body. The oxygen consumption and the metabolism of nitrogen and of carbohydrates is generally below the average, and in some patients definitely subnormal. Further evidence of disordered metabolism is seen in the inverted hemoclastic response and in subnormal reactions to changes in temperature, to work, and to the injection of insulin, epinephrine, thyroxine and other potent pharmaceuticals. Particularly is the metabolic dysharmony evident in the control of the acid-base equilibrium. This equilibrium depends for its maintenance upon the activity of the kidneys in excreting bases and of the lungs in excreting carbon dioxide. In schizophrenia the response of the kidneys is normal, but the excretion of carbon dioxide is impaired so that the condition of the patient with dementia praecox resembles that of the sleeping normal individual in being shifted over to the acid side. "A dreaming mind in a slumbering body," says Hoskins. This would appear to be due to the relative inexcitability of the respiratory center, since the alkaline tide after sleep and food is absent, the alveolar carbon dioxide tension is high, and the pulmonary ventilation is not increased to the normal extent by the administration of 2 per cent carbon dioxide in the inspired air.

Many years ago, chemical analyses of the cerebral cortex by Koch demonstrated a deficiency of neutral sulphur compounds, and a few years ago, through the kindness of the Department of Chemistry at the United States Naval Medical School, analyses for iron were made for me in a number of cases of various mental disorders. The importance of iron as a catalytic agent in oxidation-reduction processes has repeatedly been emphasized. Traces of iron are practically necessary for utilization of oxygen by glutathione and other sulphydryl radicles. Iron is a constituent of almost every living cell, copper being an occasional substitute. Cyanide is lethal to cells through suppression of the oxygen metabolism, an effect that may possibly be explained by the immediate combination of the cyanide with the iron in the cell to form an inert, readily diffusible ferrocyanide. At all events the injection of sodium cyanide into the carotid artery of a rabbit diminishes the quantity of iron demonstrable subsequently in the corresponding hemisphere of the brain (Fig. 14). Iron is most prominent in the Nissl granules and in the chromatin of the nucleus and nucleolus, the probable location of the major metabolism. More than 40 years ago, Macallum with a burst of prophetic insight declared that the fundamental life substance was an iron compound, and that life itself was to be referred to the constant oxidation and reduction of this compound.

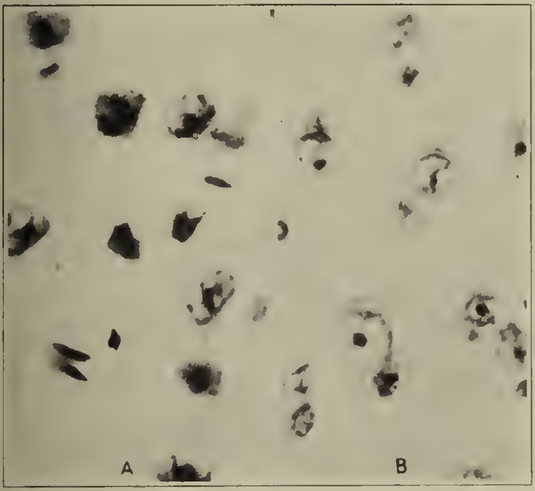


FIG. 14. CEREBRAL CORTEX FROM LEFT (*A*) AND RIGHT (*B*) HEMISPHERES OF A RABBIT AFTER INJECTION OF 1 PER CENT SODIUM CYANIDE SOLUTION INTO THE RIGHT CAROTID ARTERY

Macallum hematoxylin method for iron.

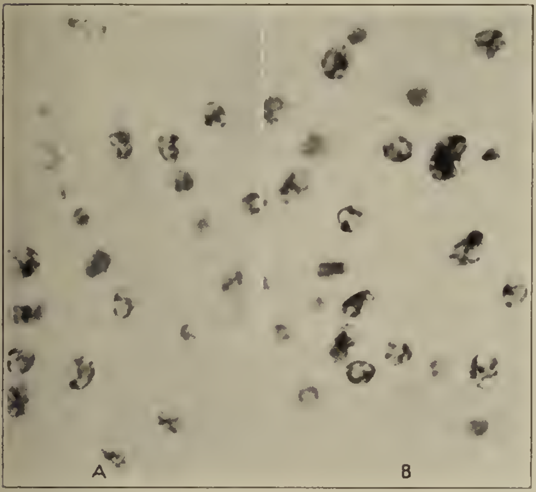


FIG. 15. GRANULE CELLS OF CEREBRAL CORTEX FROM SCHIZOPHRENIC (*A*) AND PARANOID (*B*) PATIENTS

Sections from the same location were mounted on the same slide, stained and photographed under identical conditions. Macallum hematoxylin method for iron.

Merely to summarize these studies it may be said that both quantitatively and histochemically there was found a deficiency of catalytic iron in the cortical ganglion cells in schizophrenia (Fig. 15). The lack of this catalytic agent, so essential for the utilization of oxygen by these cells, may underlie certain features in the symptomatology of the psychosis.

During the past few years dramatic results amounting to psychic resurrection have been obtained by the administration of carbon dioxide and oxygen to patients in catatonic stupor. Oxygen alone is ineffective, although by raising the tension of oxygen by submitting the catatonic patient to the pressure chamber, considerable changes in behavior have been brought about. Carbon dioxide produces a great increase in the pulmonary ventilation, a pronounced fall in pH, and at the same time, dilatation of the cerebral arterioles. All these conditions would tend to promote oxygen utilization in the cortex, and the carbon dioxide itself would seem to be a specific stimulant to cellular function.

Similar results have also been obtained by producing fever in a patient by diathermy, by injecting concentrated saline solutions to produce "salt fever," and especially by the intravenous injection of sodium amytal. Following narcosis there is often a considerable period during which the patient is able to carry on a more or less normal conversation. The physiochemical basis for this seems to lie in the greater metabolic activity present in cells after the sodium amytal has been removed. Possibly during the deep unconsciousness sufficient reacting substances might accumulate in the cortical cells to enable them to function more actively for a short period.

Insulin shock has been used in schizophrenics with most interesting results, but the permanency of these results is yet to be demonstrated.

In brief, then, the manifestations of schizophrenia may tentatively be explained, from the biochemical standpoint, on deficiency in the oxidative processes in the cerebral cortex. More fundamentally, however, there appears to be, in schizophrenia, a generalized inherent tendency to deficient oxidative processes, and dementia praecox may eventually prove to be a deficiency disease just as definitely characterized and almost as effectively handled as scurvy or rickets. Whether there is a dietary deficiency (meats, iron?) or whether some toxic substances are formed in the intestinal tract (amines, pyrophosphates, cyanides?) or whether emotionally restricted respiratory exchange leads to suboxidation, it is impossible to state. Nevertheless, it is sufficient to observe and to work with the inhabitants of the back wards of a mental hospital to suspect strongly that these patients are suffering from some vicious circle of metabolic disorder that we are powerless, as yet, to interrupt.

WATER BALANCE

Water exists in the nervous system in different bindings. There is free water in the ventricles and cisterns, in the tissue interstices, and in the cells, the former holding sodium ions, the last potassium. Water also exists in bound form in both nucleus and cytoplasm. Disturbances in water balance in the nervous system are associated with pronounced psychic phenomena. The delirium of febrile states is attributable to increase in the bound water of the cytoplasm with decrease in the interstitial moiety. The stupor, convulsions, collapse and coma of water intoxication are due to increase in the interstitial water with disturbance of the osmotic equilibrium and can be remedied almost immediately by intravenous administration of concentrated saline solution. Fever can be produced by dehydration alone, through loss of free water from the body.

The water balance is intimately bound up with the acid-base equilibrium, carbohydrate utilization and ionic equilibrium. A positive water balance may be corrected by the administration of acids, by purgation, by reduction of water intake and by replacement in the diet of carbohydrates by fats.

In epilepsy there is clearly indicated a disturbance in the water balance. Not only does the weight of an epileptic patient fluctuate considerably, with retention of water before the seizure and diuresis afterwards, but the measurement of the excretion of the various bases indicates that the water concerned is interstitial in nature, containing an excess of sodium over potassium. The removal of this interstitial water by starvation is effected because the excretion of sodium continues high for several days after the beginning of the fast. The most certain way of stopping convulsive seizures that are constantly recurring is to starve the patient. Unfortunately, this procedure cannot be carried on indefinitely in the living patient.

More or less similar results may be accomplished by salt starvation or water restriction. Somewhat more complex is the effect of the ketogenic diet. Carbohydrates require considerably more free water for their metabolism than do fats, probably about 3 cc. per gram, and conditions of acidosis associated with the ketogenic diet are apt to lead to still further desiccation of the tissues. It is a significant fact that epilepsy and diabetes are scarcely ever seen in the same individual, although convulsions may occur in a diabetic, and glycosuria in an epileptic from unusually severe disturbances in the body chemistry. So far as water balance is concerned, epilepsy and diabetes seem to be as much polar opposites as are hyperthyroidism and myxedema. The relationship of the islets of Langerhans to diabetes has prompted examination of the pancreas in epileptic patients, but while hyperplasia of the islets has been found it is by no means constant, and never of striking degree. Recent experiences with the nervous disorders of hyperinsulinism, including convulsive seizures, and their relief by subtotal pancreatectomy, led me to suggest some time ago that it might be worth while to attempt resection of the pancreas in epileptics, not so much to provoke a disorder in carbohydrate metabolism (which is usually normal in epileptics) as to bring about a condition of dehydration that would be unfavorable to the continuation of the fits. Thus far, no patient has expressed an intense desire to be treated in that manner.

Colloidal Dispersion and Aggregation

That the energy output of the brain may be influenced by alteration in colloidal aggregation and dispersion is undoubted, but there is less evidence for the suggestion that there exist natural imbalances that are manifested in disturbances of behavior. Nevertheless, it has been argued with some justification that if the behavior of the individual can be altered by the exhibition of a coagulating agent on the one hand, or of a peptizing agent on the other, there is evidence of some inherent disturbance in the colloidal system. It is known that bromides (peptizing agents) relieve excitement, and that moderate doses of alcohol and morphine (coagulating agents) relieve depression, but it is not safe to say that the relief of the excitement or of the depression is due alone to the lyotrope action of these agents. Still less certain is the hypothesis vigorously advanced by Bancroft that because bromides are effective the thiocyanates will be still more so. Between the bromide and the thiocyanate ion in the lyotrope series stands the iodide ion, an ion that is relatively inert so far as psychic activity is concerned.

Evidence of disturbed colloidal dispersion in mental disorders is accumulating. Examination of fresh blood by dark field reveals interesting phenomena of aggregation in states of excitement, and of dispersion in stuporous states. The erythrocytes in manic patients tend to be somewhat smaller than do those in depressed patients. This observation should be checked upon the same individual in the opposite phases of a manic-depressive psychosis. In a comparable pair of such patients dying suddenly, one in an excited stage, the other in a stupor, I found a large proportion of nuclei of the cortical ganglion cells large and vesicular in the depressed, and compact and hyperchromatic in the excited patient.

The most graphic parallel yet drawn with manic-depressive psychosis is that of the hibernation cycle in certain animals. The alterations in total metabolism, in calcium balance, in endocrine activity, are very striking and are probably dependent upon central regulation. Whether this control is vested in the hypothalamus is quite unknown, but it would seem probable that the various manifestations, biochemical, endocrine and behavioristic, are but different facets in a many-sided figure, the nucleus of which is to be sought in an inherited tendency to phasic alterations in colloidal dispersion in the central nervous system.

Future investigations will undoubtedly enlarge the part played by physical and physiological factors in the genesis and control of emotional and of mental reactions. Until much more is known about such factors, however, therapeutic efforts will be, as they have been in the past, directed along more or less empirical lines. How, for instance, can we persuade more iron to enter into the nuclei of cerebral ganglion cells? How can we persuade an organism to give up what appears to be an inherent tendency to exaggerated phasic alternations in total energy output when we know that phasic alternations in general are basic in physiologic processes? How can we make people with slender skeletons broaden out, and those with short heavy skeletons elongate themselves? How can we insure a person developing a constitutional resistance to tuberculosis, or to cancer? Medical science is powerful only against the accidents and emergencies that arise in the course of our lives, and is ill equipped to handle the conditions that seem to be imposed upon the human race as part of the inevitable mixing of characteristics seen in any biologic organism. Changing the Constitution of the United States is child's play in comparison with changing the constitution of man.

Summary

I have presented a review of my own work on the question of the organic background or coordinates of personality. I do so with apologies for its incompleteness, and for the lack of reference to the work of others in this field. Much of it is new, however, in the sense that it represents original investigation, although the results have been published in a number of different periodicals. On the basis of the work, and of this review, I am forced to say that the etiology of the great mental diseases, schizophrenia, manic-depressive psychosis, paranoia and epilepsy is far from settlement. Some interesting facts have been detailed, some hypotheses advanced, some conclusions drawn, but the work, I feel, is valuable mostly in a negative way, in revealing blind alleys. Bodily conformation correlates fairly well with mental reaction. Susceptibility or resistance to certain diseases correlates quite markedly with mental reactions—but what of it? The mental reaction does not cause the disease, nor does the disease cause the mental reaction. Something is behind them. I believe I have shown that the endocrine system plays a much more significant rôle in the growth and development of the body than it does in determining the quality of the personality. I have suggested some biochemical patterns of reaction that are associated with mental patterns of behavior, but thus far there has been no indication of a method by which these biochemical patterns could be altered, or even stabilized. Nevertheless, it seems to me personally that much more will be accomplished along lines of biochemical investigation and therapy than by researches in anthropology, nosology, or endocrinology. Perhaps the new field of electrophysiology, of cerebral action currents, so promising in the realm of epilepsy, will open vistas of cerebral activity that are at present closed to us. Even more promising is the exploration of the central vegetative centers in the interbrain where central control of metabolism and of the viscera and of the appetites seems to be located. The behavior disturbances following relatively localized disease of this region as in encephalitis and syphilis give hope that we may be able to influence behavior in a significant manner by destroying certain localized portions. Moniz has recently reported striking benefit following section of the frontal association fibers in man.* Genetic studies on twins, as mentioned earlier, are of great importance in determining the factors responsible for abnormal behavior, but even so, probably none of these methods will disclose what appears to be a vicious circle of altered chemical responses that appears to lie at the bottom of the so-called functional psychoses.

The field is well defined, the material is abundant. About one half of the total hospital beds in this country are occupied by patients with mental disease, and the hospitals are always overcrowded. As many patients died in Washington last year with mental diseases as died of cancer. Any large mental hospital has inmates who have lived there continuously for 50 years and more. It stands to reason that nothing much is to be expected in the treatment of psychoses due to senility, arteriosclerosis or other organic brain disease with the exception of early dementia paralytica, but it does seem a pity that a patient who has been an inmate of the institution since you and I were born should come to necropsy and reveal what appears to be a perfectly normal brain in a reasonably healthy body. There is a riddle somewhere, and neither psychology nor psychiatry nor psychoanalysis, on the one hand, nor morphology nor pathology nor bacteriology, on the other hand, has gone any distance at all in its solution. The advances of the future will come through physiology and biochemistry.

BIBLIOGRAPHY

Bentley, M., and Cowdry, E. V.: The Problem of Mental Disorder. National Research Council, Committee on Psychiatric Investigations. New York, McGraw-Hill, 1934.

Freeman, W.: Biometrical Studies in Psychiatry; the Chances of Death. Am. J. Psychiat., 1928, **8**, 425.

Freeman, W.: The Psychological Panel in Diagnosis and Prognosis; Correlation of Personality Type with Susceptibility to Disease, Based Upon 1,400 Necropsies. Ann. Int. Med., 1930, **4**, 29.

Freeman, W.: Deficiency of Catalytic Iron in the Brain in Schizophrenia. Arch. Neurol. & Psychiat., 1930, **24**, 300.

Freeman, W.: Psychochemistry; Some Physicochemical Factors in Mental Disorders. J. A. M. A., 1931, **97**, 293.

Freeman, W.: Manic-depressive Psychosis. Constitution of the Cyclothymic. Ass. Res. Nerv. & Ment. Dis., Proc. (1930), Baltimore, Williams & Wilkins, 1931, p. 51.

Freeman, W.: The Small Heart in Schizophrenics. Biometrical Studies in Psychiatry. II. Bull., St. Elizabeths Hosp., 1931, **7**, 59.

(*Concluded on page 352*)

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*For a report of this procedure by myself and Dr. Watts, see this issue of the Annals, p. 326.

MEDICAL ANNALS

of the

DISTRICT OF COLUMBIA

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THE DIPHTHERIA CAMPAIGN

The Health Department is conducting an intensive campaign among the economically disadvantaged to eradicate diphtheria in the District of Columbia. By well established methods the elimination of this disease is possible. Where the fight has been made along all fronts, practicing physicians, health department physicians, parent-teacher associations, citizens' associations, and similar organizations, the occurrence of diphtheria has been reduced to very low figures, so that diphtheria promises to become a rarity in a few years in the cities and states in which there is intelligent and continuous attack upon it.

Washington, although the nation's capital and possibly because of this fact, does not lead in matters of health. It is dependent upon the action of Congress for its health department appropriations. The Surgeon General of the United States Public Health Service recently referred to the District of Columbia as 'a black spot' upon the map of America in matters of public health and preventable disease. The habit among Washingtonians of accepting this fact complacently, pointing to the relatively high percentage of negro inhabitants, as the explanation, must be given up. High morbidity and mortality is found also among the white population of the District. Let us face the facts—as a community we are, and have been for years, lagging generally in the control of preventable diseases.

Let us examine the figures with regard to diphtheria in the District of Columbia as given by the Health Department. In 1935 our mortality rate was 5 per 100,000 inhabitants; in 1925 the rate was the same. No reduction in 10 years! The rate for the United States as a whole in 1935 was 3.3—lower than ours. In many municipalities and states, where unceasing attacks have been waged, the mortality rate in 1935 was one tenth of what it was in 1925, with a steady, consistent reduction year by year. State and municipal departments have planned campaigns, and medical societies and welfare organizations have coöperated. In 1935 the District of Columbia had about 1,000 cases of diphtheria with 29 deaths. Up to October 24 of this year there have been reported 744 cases with 22 deaths. The year 1936 is likely to equal in diphtheria cases and deaths the 1935 record, since the peak of the diphtheria incidence is generally in November. Furthermore, among the cases of diphtheria occurring here, there have been some malignant cases, rapidly invading, and highly dangerous to life. None of this suffering and none of these deaths were necessary. It is so easy to take action to prevent them.

About 60 per cent, more or less, of the deaths from diphtheria occur in those under 5 years of age. It is estimated that there are 40,000 children in this age group in the District of Columbia. One fourth of these, or 10,000 children, are "economically disadvantaged," and the Health Department proposes to protect them at public expense. Teams of workers are immunizing the first grade children against diphtheria, and all under that age whom they are able to contact, as they go to the various schools and meet the kindergarten and first grade children. The Health Department expects practicing physicians to take care of the immunization of the 30,000 children between 6 months of age and school age, whose parents are regarded as able to pay their family doctors. It is certainly the duty of all doctors to persuade and convince parents of the need for securing immunization for their young children before they go to school—indeed, rather while they are infants in their mothers' arms. This is the way success has been attained in places where the occurrence of diphtheria has been reduced to slight proportions. Doctors contact all of the children in their practices and give diphtheria protection to them. They have been doing this for 10 years and longer, and they know that they will have to continue doing this very thing, or an immune population will grow up and there will be more diphtheria.

The Health Department should and has planned this campaign. It is now in execution. This is the season of the year when the general health of children is at its best and the time for immunizations most logical. Every licensed practitioner of medicine in the District of Columbia should attempt to educate his families to the end that every child should be protected against diphtheria now, at the earliest possible moment, provided the child be in good condition for reception of the injection.

The methods are simple. The 1-dose injection of diphtheria alum precipitated toxoid, 1 cubic centimeter, subcutaneously, will establish in 30 to 60 days active immunity in about 85 per cent of children. Six months to a year later these children should be given the Schick test to ascertain their immunity. If Schick positive, they should be given more toxoid. If the doctor wishes to do a little better work and can control his patients, he will get a higher percentage of immune children by giving them 2 or 3 doses, spaced at 3 to 4 weeks; in such children the Schick test is less likely to become positive again. Schick tests are important guides to the child's need of immunization. It is assumed that all children under 8 years of age are susceptible to diphtheria and should receive immunizing doses. It is a refinement to do preliminary Schick tests among them. But it is a necessity for intelligent appraisal of immunity to do follow-up Schick tests 6 months to a year after inoculations, and every year or two afterward when the 1-dose method of immunization was employed. Much less frequent Schick testing will suffice for those who have received 2 or 3 doses of toxoid properly spaced, i.e., 3 or 4 weeks apart.

The Subcommittee on Communicable Diseases of the Committee on Public Health of the Society has invited the 15 Fellows of the American Academy of Pediatrics in the District of Columbia, and also the full-time physicians in the Health Department engaged in prevention of disease, to work with it in activities promoting better health among infants and children. With the coöperation of every licensed physician in the District of Columbia, which should be given, reduction in morbidity and mortality will be accomplished rapidly while we work, but no longer. Results will come by reduction in the amount of diphtheria. Other diseases will also be brought under control. For the present let us all join with the Health Department in extending, solidifying, and establishing the campaign against diphtheria.

H. H. D.

Diphtheria is a DISGRACE to the doctor and the parent. Prevent it, don't treat it. Immunize NOW!

REPORT OF ACTIVITIES OF THE HEALTH SECURITY ADMINISTRATION FOR THE DISTRICT OF COLUMBIA

The Medical Society of the District of Columbia was instrumental in setting up the Health Security Administration for the District of Columbia, formerly called the Medical Economic Security Administration for the District of Columbia. Through its members on the Boards of Directors of the Central Admitting Bureau for Hospitals, Inc., and the Medical-Dental Service Bureau, Inc., it plays a large part in controlling the destinies of the Administration. The members of the Society should, therefore, consider this as a matter in which they have very personal interests. They should boost the organization as much as possible and do their individual part in making it more and more of a success.

The Health Security Administration has as its object the providing of medical facilities and medical and dental services for all those individuals in the District of Columbia who are not in the financially privileged group. Nothing is perfect, and there still remain some weak links in the plan adopted in the District of Columbia for the purpose mentioned. However, it is felt by the Boards of Directors of the Bureaus concerned that the greatest part of the function of the Administration is now being performed.

CENTRAL ADMITTING BUREAU FOR HOSPITALS

In the year and 9 months of existence of the Central Admitting Bureau for Hospitals, which began to function January 1, 1935, that Bureau enabled 22,757 underprivileged sick individuals to secure hospitalization with the aid of funds set aside for this purpose by the Community Chest of Washington, D. C. During the first year the Bureau provided hospitalization for 7,944 persons, whereas in the first 9 months of the second year it has provided hospitalization for 14,813 persons. Most of the individuals above mentioned helped to defray part of the expense of hospitalization, the balance up to $4.00 per day having been completed by the Community Chest. Medical services were rendered without cost by the physicians on the staffs of the 9 hospitals affiliated with the Community Chest.

During the year and 9 months of its existence, the Bureau has issued 122,869 passes to applicants who desired medical attention in the Outpatient Departments of hospitals affiliated with the Community Chest. During the first year 78,974 passes were issued, and during the first 9 months of the second year 43,895 passes were issued. The Community Chest has paid $0.50 for each visit of all patients treated in the Outpatient Departments of these hospitals who received passes from the Central Admitting Bureau for Hospitals. The hospitals affiliated with the Community Chest do not receive any compensation from the Community Chest for work done unless it has been certified to on the individual patient basis through the Central Admitting Bureau for Hospitals. All medical services rendered in the Outpatient Departments have been rendered gratis by the staff physicians.

To bring home the great amount of work done by the Central Admitting Bureau for Hospitals, Mr. Ross Garrett, Executive Director of the Bureau, has made the following compilation:

IN A WORKING DAY AT THE CENTRAL ADMITTING BUREAU FOR HOSPITALS

Every 4½ minutes a pass is issued for medical care (in a hospital where the doctors give their time and skill freely and the Community Chest helps pay for the facilities).

Every 15 minutes complete arrangements are made for a Community Chest aided patient to be admitted to a hospital.

Every 2½ minutes service is given to solve the problem of providing medical care or hospitalization to persons unable to adjust themselves to their needs.

One out of every 8 beds occupied in the 9 Community Chest hospitals is arranged through the Central Admitting Bureau for Hospitals and provided through Community Chest money.

Every 60 minutes of the hospital non-emergency day a needy child's tonsils are removed.

Every 24 hours 6 babies arrive with a proper start—(arrangements through the Central Admitting Bureau for Hospitals—services given by the city's best obstetricians—funds for hospitalization by the Community Chest).

More than 38,000 treatments for venereal diseases—syphilis and gonorrhea—will be provided this year in clinics of Community Chest hospitals.

MEDICAL-DENTAL SERVICE BUREAU, INC.

The purpose of this Bureau is to aid persons of small income to receive all necessary hospitalization and medical and dental care according to their ability to pay. The Bureau is housed in the same building, The Health Security Building, at Eighth and Eye Streets, N.W., as the Central Admitting Bureau for Hospitals and the Permit Bureau of the Board of Public Welfare. The Medical-Dental Service Bureau aids the patient in budgeting his debts incurred as a result of sickness and aids him in paying off these debts in a reasonable length of time, namely, 8 months to 1 year. The hospitals, physicians and dentists permit patients in this category to use the facilities of the Medical-Dental Service Bureau. These patients are urged not to take private rooms in hospitals, but rather semi-private rooms. The hospitals are not asked to reduce their rate, but it sometimes happens that physicians and dentists after being informed of the fact that their patient could not pay off his indebtedness in a reasonable length of time have voluntarily reduced their fees to the point where this was possible. The patient agrees to pay so much each pay day to the Medical-Dental Service Bureau, which, in turn, forwards to each debtor involved a prorated share of the amount paid less 10 per cent, which is retained for the purpose of running the Bureau. At the present time this Bureau is collecting about 87 per cent of the moneys promised by patients, which is a very high figure for the economic group concerned. The Bureau never sues. If a patient discontinues payments it is almost always due to further depression of the patient's income or to some other catastrophe which makes it impossible to continue paying.

The Medical-Dental Service Bureau, Inc., began to function on March 1, 1935, and from that date until October 1, 1936, it has interviewed 2,032 persons seeking aid through its auspices and has accepted 1,714 accounts. About 50 per cent of these people were referred to the Bureau by physicians and approximately 16 per cent by hospitals. The remainder were referred by dentists, friends and employers.

This Bureau also acts as the collection agency for the Central Admitting Bureau for Hospitals on the accounts of the patients aided by the Community Chest. In other words, the Bureau collects the moneys which these patients promise to pay themselves toward defraying expenses of hospitalization. In the period above mentioned the Bureau has handled 4,720 accounts for the Central Admitting Bureau for Hospitals.

The total business placed on the books of the Medical-Dental Service Bureau in its first 19 months of existence was $313,166.97. During this same period the Bureau collected $213,834.39.

The expenses of running the Medical-Dental Service Bureau during these first 19 months of existence amounted to $24,341.20. It will be noted that this is nearly $3,000.00 in excess of its income which was $21,383.44. The deficit is explained by the fact that it took several months in the beginning for the Bureau to collect sufficient moneys to defray its running expenses. At the present rate of income and expenditures, it will not be many months before the Bureau is running without a deficit and is able to accumulate a reserve. At the present time the Bureau is actually showing a profit of from $200.00 to $500.00 each month.

The Medical-Dental Service Bureau has 6 employees, an executive director, an auditor, a cashier, a typist, a telephone operator and a janitress. The last 2 employees are shared with the Central Admitting Bureau.

During the 19 months of its existence 376 physicians and 121 dentists made use of the Medical-Dental Service Bureau for their patients. This means that 39.5 per cent of the members of the medical societies and 31.33 per cent of the members of the dental societies made use of the Bureau.

It is important to note that many of the cases handled by the Medical-Dental Service Bureau involved hospitalization and 2 or more physicians.

Permit Bureau of the Board of Public Welfare

This Bureau is closely allied with the two previously discussed Bureaus. The Permit Bureau determines the eligibility of individuals for hospitalization and clinic care at the expense of the Government of the District of Columbia. Such individuals must be indigent and have been residents of the District of Columbia for at least 1 year. Besides the Gallinger Municipal Hospital of over 1,250 beds, the Tuberculosis Hospital and the Children's Tuberculosis Sanatorium, the Board of Public Welfare has contracts for the hospitalization of a certain number of patients at the Casualty, Children's, Emergency and Freedman's Hospitals. During the fiscal year ending June 30, 1936, 27,293 patients were admitted to these hospitals. The daily average number of such patients in these hospitals was 1,529. The average number of days of hospitalization per patient was 19.57. The average varied, however, with different hospitals from 8.91 days per patient in the Casualty Hospital to 189.28 days per patient in the Tuberculosis Hospital. Of the patients hospitalized 5,815 were white male patients, 4,402 were white female patients, 7,407 were colored male patients and 9,669 were colored female patients. By far the greater amount of professional services rendered these patients was done so without expense to the patients nor to the Government of the District of Columbia by the members of the visiting staffs of the hospitals. The cost of the amount of professional services thus rendered may be estimated at $1,943,376.00 for the year under discussion.

N. B.—The statement that the Community Chest pays to the hospital, through the Central Admitting Bureau for Hospitals, the deficit to make up $4.00 for each in-patient and $0.50 for each visit to out-patient, must be qualified by explaining that this is done only to the extent of the amount of money budgeted by the Community Chest for these purposes. The hospitals actually have to stand some of this expense themselves because as a rule the money so budgeted runs out toward the end of the year.

TRANSACTIONS OF THE SOCIETY

Stated Meeting, November 4, 1936

The following were duly elected to membership upon recommendation of the Committee of Censors:

Active Members

Morris Chase, 4100 Fourteenth Street, N.W.
Richard Earle deButts, 1150 Connecticut Avenue, N.W.
Frank Whitton Govern, 1726 M Street, N.W.
Stephen Elliott Kramer, Jr., 713 Nineteenth Street, N.W.
Mark Perry Schultz, 2116 Kalorama Road, N.W.
Francis Neilson Strawbridge, 2210 Nichols Avenue, S.E.

Associate Members

John Nevins Andrews, 116 Willow Avenue, Takoma Park, Md.
Read Nathaniel Calvert, Takoma Park, Md.

Applicants for membership to be voted on in January, 1937:

For Active Membership

Theodore Judson Abernethy, Johns Hopkins University—1929
Francis Charles Allman, Georgetown University—1934
Abe Blajwas, George Washington University—1932
John Leland Cardwell, George Washington University—1930
John Warren Casady, Georgetown University—1930
Leah Huntley Cate, George Washington University—1935
Austin Brockenbrough Chinn, University of Virginia—1932
Emmett Grayson Croiner, Hahnemann Medical College—1929
Karl Coates Corley, Georgetown University—1932
Allen Slayman Cross, George Washington University—1935
Edgar Willingham Davis, Emory University—1922
John Vincent Dolan, Georgetown University—1926
Harry Samuel Douglas, George Washington University—1932
James Albert Dusbabek, George Washington University—1934
Thomas Aloysius Egan, Georgetown University—1930
Martha May Eliot, Johns Hopkins University—1918
Clayton Bernard Ethridge, University of Virginia—1933
John Francis Finnegan, Georgetown University—1931
Irvin Hantman, University of Maryland—1932
Russell Kuhner Hollingsworth, George Washington University—1920
Edward Lee Howes, Yale University—1928
Helen Gladys Kain, George Washington University—1923
Howard Katzman, Georgetown University—1933
Raymond Charles Kirchner, Georgetown University—1930
Edward A. Krause, George Washington University—1927
Leslie Keith MacClatchie, Rush Medical College—1926
Benjamin Manchester, George Washington University—1936
Franklin Hervey Maury, Tulane University—1932
William Sterling Miller, George Washington University—1933
Charles Aloysius Millwater, Georgetown University—1932
Leland Conner Moss, University of Cincinnati—1930
Joel Norton Novick, George Washington University—1929
Morris Silverman, George Washington University—1933
Ashby Wade Smith, University of Maryland—1933
Luther Henry Snyder, George Washington University—1935
Maurice van Kinsbergen, Georgetown University—1935

For Associate Membership

Eloise Blaine Cram, Ph.D., George Washington University—1925
Jay Louis Hoffman, University of Pennsylvania—1934
William R. Osgood, Ph.D., University of Illinois—1933
Manson Bowers Pettit, Vanderbilt University—1928
Edward William Wallace, University of Chicago—1935

COMING MEETINGS

Wednesday, December 2: Business Meeting of the Society.

Thursday, December 3: *Section on Neurology and Psychiatry.*

1. "Chordotomy for the Relief of Pain." H. H. Schoenfeld, M.D.
2. "The Insulin Shock Treatment of Schizophrenic Patients." S. Katzenelbogen, M.D., of the Phipps Psychiatric Clinic, and Herbert E. Harms, M.D., of Spring Grove State Hospital, Baltimore.

Wednesday, December 9: Joint meeting with the Washington Heart Association, in the Medical Society Building.

"Some Pitfalls in the Diagnosis of Heart Disease." Samuel A. Levine, M.D., Assistant Professor of Medicine, Harvard Medical School.

Wednesday, December 16:

1. "Recent Advances in Proctology." Illustrated with

lantern slides. Garnet W. Ault, M.D. Discussion: William B. Marbury, M.D.
2. "Court of Appeals Decisions, with Excerpts of the Evidence, in Cases Brought By and Against Washington Physicians." Frederick A. Fenning, Counsel for the Society.

Recess, Holiday Season.

NEWS AND PERSONALS

The **Smith-Reed-Russell Society** of the George Washington University School of Medicine was addressed on November 17, 1936, by Dr. Ernest Muir, Secretary, British Empire Leprosy Relief Association, London, England.

The Smith-Reed-Russell Society's Annual Banquet was held at the Kennedy-Warren, on the evening of November 17, 1936. Dr. Charles Franklin Craig of the Department of Tropical Medicine, Tulane University, was the guest speaker whose subject was "Factors Influencing the Transmission of Malaria." President Cloyd Heck Marvin; Dr. F. A. Hornaday, Assistant Professor of Medicine and University Physician; and Dr. Coursen B. Conklin, Clinical Professor of Medicine, of the faculty, were inducted into honorary membership. Among the guests introduced by Dean Earl B. McKinley were Major General Charles R. Reynolds, Surgeon General, United States Army; Admiral Percival S. Rossiter, Surgeon General, United States Navy; Colonel Joseph F. Siler, Director, Army Medical School; Captain Harold W. Smith, Director, Naval Medical School; Dr. Malcolm M. Soule, Professor of Bacteriology, University of Michigan; Dr. N. Paul Hudson, Professor of Bacteriology, Ohio State University; Dr. George W. Bachman, Director, School of Tropical Medicine, San Juan, Puerto Rico; Colonel P. M. Ashburn, United States Army, Retired; Dr. Ernest Carroll Faust, Professor of Parasitology, Tulane University. Mrs. Joshua Evans, Jr., Alfred Henry Lawson and Walter R. Tuckerman, members of the University's Board of Trustees, were also present.

The **Washington Medical and Surgical Society** meets on the fourth Monday of each month. The officers for the year 1936–37 are as follows:

J. Duerson Stout, *President*
Joseph Horgan, *Vice President*
Robert Oden, *Secretary*
Frank E. Gibson, *Treasurer*

The **Washington Ophthalmological Society** met on Monday, November 2, 1936, at 7:30 P.M., at the Episcopal Eye, Ear & Throat Hospital. The program:

1. "Hemangioma of the Orbit." LeRoy W. Hyde, M.D.
2. "Papilloma of Canaliculus." John W. Burke, M.D.
3. "The Etiology of Squint." Professor A. Bielschowsky, Dartmouth Medical School.

Dr. James Alexander Lyon, Professor of Clinical Cardiology, Georgetown University School of Medicine, had his paper "Cardiac Pain and Its Significance," published in the New England Journal of Medicine, November 19, 1936, Volume 215, Number 21.

Dr. W. Calhoun Stirling was the annual speaker before the North Central Branch of the American Urological Association, on September 26, 1936, in Cincinnati, Ohio; his subject, "Experimental Study of Anemia in Injured Kidneys."

The **Baltimore City Medical Society** held a joint meeting with the Medical Society of the District of Columbia on October 28, 1936. Following a most interesting program a social hour was spent. The local profession was most pleased to act as hosts to fellow-practitioners from our Sister City. A letter to our Program Committee Chairman follows:

> Dear Dr. Borden:
>
> It was the consensus of opinion that the recent joint meeting in Washington was one of the most pleasant that has been held.
>
> It was also agreed that these meetings must be held as frequently as possible and we are looking forward to the time when the Washington members will come to us so that we may return their hospitality.
>
> Yours very sincerely,
> (Signed) Frank J. Geraghty, M.D.
> Secretary
> Baltimore City Medical Society

The **Southern Medical Association** met in Baltimore, November 17–20, 1936. The following members of the Medical Society of the District of Columbia participated in the program.

Papers:

Henry L. Darner. Preliminary Care of the Cervix in Subtotal Hysterectomy; Surgical Technic. Report of Cases.

William Thornwall Davis. Orthoptic Training.

Frank J. Eichenlaub and I. Lewis Sandler. Subcutaneous Fat Necrosis of the New-born.

Walter Freeman and James W. Watts. Prefrontal Lobotomy in the Treatment of Mental Disorders.

Henry H. Hazen, et al. Evaluation of Serodiagnostic Tests for Syphilis Upon the Spinal Fluid.

William P. Herbst, Jr. Patent Urachus.

Howard F. Kane. A Symptom and a Sign of Impending Postcesarean Hemorrhage.

Guy W. Leadbetter. Fracture Dislocations of the UpperEnd of the Humerus.

Edwin A. Merritt. Radiation Therapy in Carcinoma of the Rectum.

A. Camp Stanley. Cardiologic Significance of Epigastric Pain. Discussion by James Alexander Lyon.

W. Calhoun Stirling and A. M. Lands (Ph.D.). Blood Findings, Renal Function and Pyelographic Diagnosis in Kidney Trauma. An Experimental Study.

Joseph S. Wall. Interstitial Bronchopneumonia in Children.

Discussion:

Harry F. Anderson opened the discussion of paper by Augustus H. Lancaster, Knoxville, Tenn., entitled, "Clematis Dermatitis."

Grafton Tyler Brown opened the discussion of paper by Homer E. Prince, Houston, and Marie Betzner Morrow (Ph.D.), Austin, Texas, entitled, "Molds in the Etiology of Asthma and Hay Fever with Special Reference to the Coastal Areas of Texas."

Frank J. Eichenlaub participated in the discussion of paper by J. Richard Allison, Columbia, S. C., entitled, "Hyperglycemia in Skin Diseases."

Ella M. A. Enlows participated in the discussion of paper by Dorothy Wolf, St. Louis, Mo., entitled, "Microscopic Anatomy of the Temporal Bone, Showing Pathologic Routes of Extension to the Cranial Cavity."

Custis Lee Hall opened the discussion of paper by F. A. Hoshall, Charleston, S. C., entitled, "Pyogenic Psoas Abscesses."

Harry H. Kerr opened the discussion of paper by Hubert A. Royster, Raleigh, N. C., entitled, "Notes Upon the Physiology and the Pathology of the Vermiform Appendix."

Lee McCarthy and Walter O. Teichmann participated in the discussion of paper by Robert L. Kelly, Louisville, Kentucky, entitled, "Early Treatment of Cutaneous Neoplasms."

Earl Baldwin McKinley opened the discussion of paper by H. H. Anderson, G. A. Emerson and C. D. Leake, San Francisco, Calif., entitled, "Chemotherapy of Leprosy."

John Minor opened the discussion of paper by Conley H. Sanford, Memphis, Tenn., entitled, "Drainage as a Factor in the Treatment of Lobar Pneumonia."

Matthew White Perry participated in the discussion of paper by William Calvert Chaney, Memphis, Tenn., entitled, "The Relative Importance of Food Idiosyncrasy in Gastro-intestinal Disease."

James W. Watts opened the discussion of paper by Paul F. Dickens, Washington, D. C., entitled, "Benign Lymphocytic Choriomenginitis: A New Disease Entity, with Special Reference to the Pathologic Findings."

Oscar Wilkinson opened the discussion of paper by K. W. Constantine, Birmingham, Ala., entitled, "A Type of Iridencleisis."

Exhibits:

William Thornwall Davis. Demonstration of the Technic of Orthoptic Training. Motion-picture: Orthoptic Treatment of Squint.

J. Bay Jacobs. Practical Application of Obstetric Devices Invented by the Exhibitor.

C. A. Simpson, Russell J. Fields and Theodore C. C. Fong. (1) Results of Diathermy Treatment of Syphilis of the Brain; (2) Interesting Dermatological Lesions.

W. Calhoun Stirling and A. M. Lands (Ph.D.). Experimental Trauma of the Kidney.

Eugene R. Whitmore. Whole Organ Sections, Gross and Microscopic.

General:

Of special interest to Washingtonians was the presentation of the Walter Reed Medal to Mrs. Walter Reed on Thursday, November 19, at 12:15 Noon, by Colonel J. F. Siler, M. C., U. S. Army.

Mrs. Prentiss Willson presented "In Memoriam," before the Woman's Auxiliary to the Southern Medical Association.

George Robert Lee Cole, M.D.

(1864-1936)

Dr. George Robert Lee Cole, a life member of the Medical Society of the District of Columbia since January 1, 1931, who died November 10, 1936, was graduated in pharmacy from the National College of Pharmacy, now a component of the George Washington University, in 1884; later he received his degree in medicine from the School of Medicine of the University of Maryland in 1887. He served on the House Staffs of Providence and Emergency Hospitals, later attending clinics in Saint Thomas' Hospital, London. In addition to active membership in the Medical Society of the District of Columbia, which began May 27, 1890, he was a member of the Clinico-pathological Society, having served a term as President. Dr. Cole was much interested in Masonry, being the oldest member at the time of his death of the Alexandria-Washington Lodge. At one time he was a commissioned officer in the National Guard of the District of Columbia, serving as Acting Assistant Surgeon. He is survived by a son, G. R. L. Cole, Jr., Falls Church, Virginia; a daughter, Mrs. Charles M. Marsteller, Bridgeport, Connecticut, and three grandchildren. The funeral was held at Saint Paul's Episcopal Church, Rock Creek Parish, on Thursday, November 12, 1936. Drs. Robert W. Baker, Raymond T.

Holden, Thomas S. Lee, Fred Repetti, George R. Sorrell, and Lewis H. Taylor served as honorary pall-bearers.

CONTAGIOUS DISEASE REPORT

October, 1936

Health Department, District of Columbia

	Morbidity	*Mortality*
Typhoid fever	7	1
Typhus fever	0	0
Smallpox	0	0
Measles	20	0
Scarlet fever	42	0
Whooping cough	92	11
Diphtheria	*71*	*3*
Influenza	3	2
Poliomyelitis	2	0
Encephalitis-Lethargica	0	0
Epidemic cerebrospinal meningitis	8	3
Tuberculosis (all forms)	116	54
Syphilis	*527*	*15*
Chancroid	377	0
Gonorrhea	6	0
Chickenpox	12	0
Pellagra	1	1
Pneumonia (all forms)	69	61

Comment: The diphtheria and syphilis rates should be well observed. Both diseases are preventable. A live interest taken by all will gain much in reducing the morbidity and mortality. Above all an awareness of the situation is necessary. The local Health Officer's campaign, with the placing of toxoid without cost within the reach of the licensed M.D., should be followed until 100 per cent of babies are protected within their first 6 months of life. The Surgeon General of the United States Public Health Service in Survey Graphic, under the title, "Why Don't We Stamp Out Syphilis?", writes concerning the things to do:

> "1. Find syphilis. The obscure cases will never be found in time except by the Wassermann dragnet.
>
> 2. Treat syphilis promptly. A few days' delay may mean failure of treatment.
>
> 3. Examine for syphilis the family and all other contacts of the syphilis patient.
>
> 4. Prevent the birth of syphilitic babies by requiring blood tests before marriage and early in each pregnancy.
>
> 5. Teach syphilis. The facts about it must be known to all the people."

According to the Health Department records there were 71 too many cases of diphtheria and 527 too many cases of syphilis in the District of Columbia in October.

Smallpox out; Diphtheria down, but not OUT. Immunize NOW!

REPRINTS RECEIVED

The following reprints have recently been received for which due acknowledgment is made:

"Hypersensitiveness to Fungi," Grafton Tyler Brown, M.D., Journal of Allergy, July, 1936.

"March Foot," Joseph F. Elward, M.D., American Journal of Roentgenology and Radium Therapy, August, 1936.

"Bilateral Osgood-Schlatter's Disease," Joseph F. Elward, M.D., Radiology, May, 1936.

"Diaphragmatic Hernia and Diverticulum of the Esophagus," Joseph F. Elward, M.D., American Journal of Roentgenology and Radium Therapy, September, 1936.

"A Case of Bilateral Osteochondritis Deformans Juvenilis Coxae (Legg-Calvé-Perthes Disease)," Joseph F. Elward, M.D., and Robert A. Bier, M.D., Radiology, July, 1936.

"The Management of Renal Tumors, Including Cysts," R. M. LeComte, M.D., Journal, American Medical Association, December 14, 1935.

"Indications for Operation in Renal Stones," R. M. LeComte, M.D., Southern Medical Journal, May, 1936.

"An Unusual Case of Renal Tuberculosis and Solitary Cyst," R. M. LeComte, M.D., and Eugene R. Whitmore, M.D., Urologic and Cutaneous Review, December, 1935.

"Preliminary Basal Anesthetic Medication in Children," E. B. Macon, M.D., Anesthesia and Analgesia, July-August, 1934.

"A Case of Megalogastria and Megaduodenum," Joseph P. Madigan, M.D., Southern Medical Journal, November, 1934.

"Ambulatory Pneumothorax in Pulmonary Tuberculosis," W. D. Tewksbury, M.D., Diseases of the Chest, July, 1936.

"The Results of Superior Cervical Sympathectomy in Angina Pectoris," Harry Hyland Kerr, M.C., Southern Surgeon, October, 1936.

BIBLIOGRAPHY (*Concluded from page 344*)

Freeman, W.: Human Constitution; a Study of the Correlations Between Physical Aspects of the Body and Susceptibility to Certain Diseases. Ann. Int. Med., 1934, **7**, 805.

Freeman, W.: Weight of the Endocrine Glands; Biometrical Studies in Psychiatry. Human Biol., 1934, **6**, 489.

Freeman, W.: Personality and the Endocrines; Study Based upon 1,400 Quantitative Necropsies. Ann. Int. Med., 1935, **9**, 444.

Pearl, R., Gooch, M., and Freeman, W.: A Biometric Study of the Endocrine Organs in Relation to Mental Disease. Human Biol., 1935, **7**, 350, 555.

Other references to the literature will be found in the author's previous publications.

MEDICAL ANNALS

of the

DISTRICT OF COLUMBIA

VOLUME V DECEMBER, 1936 NUMBER 12

DISEASES OF THE MAJOR DUODENAL PAPILLA IN MAN*

VINCENT J. DARDINSKI, M.D., Ph.D.

Professor of Anatomy, Georgetown University School of Medicine

In order that the reader may properly understand and thoroughly appreciate the pathologic processes occurring in the major duodenal papilla, it is necessary that he have a definite concept concerning the anatomy of this region.

From our text-books of anatomy it is impossible to arrive at any definite understanding concerning the anatomy of the major duodenal papilla because it is described too briefly and incompletely.

The literature on this subject, which dates back to the time of Abraham Vater, 1720, is sparse and very controversial. The controversy, however, hinges around the idea of whether a true sphincter of Oddi is or is not present at the base of the papilla. As to the anatomy of the remainder of the papilla very little can be found in the literature. What is present is vague and indefinite.

I feel, therefore, that to review all the literature on this phase of the subject would add nothing, but would rather detract from what is to follow.

Since I have made a complete study of this anatomical area I believe a brief résumé of the pertinent parts of this work recounted here, compared with the works of others found in the literature, will aid the reader greatly in grasping the various pathologic changes taking place in this region.

LOCATION OF THE MAJOR DUODENAL PAPILLA

The major duodenal papilla is that portion of the duodenum through which, in the majority of instances, the common bile duct and the main pancreatic duct, or duct of Wirsung, empty their respective secretions into the intestine. Under normal conditions it is situated on the medial aspect of the descending portion of the duodenum, approximately 7.5 centimeters from the pyloric valve of the stomach. It is not to be confused with the minor duodenal papilla through which the accessory pancreatic duct, or duct of Santorini, sometimes empties into the duodenum. The latter is found in the same portion of the duodenum as the former, but it is usually 2 to 3 centimeters nearer to the pyloric valve and is much smaller (Fig. 1A).

HISTOLOGIC ANATOMY

The histologic anatomy of the major papilla varies somewhat from the remainder of the intestine, because, although it is usually described as a separate anatomic unit, it is not absolutely so, for its layers are intimately connected with the layers of the intestine. It is this association with the intestine that makes it difficult to study and appreciate.

The layers of the intestine, from within out, are mucosa, submucosa, muscularis and serosa. Whereas the layers of the major duodenal papilla in the same order are mucosa, submucosa, muscularis, submucosa and mucosa. The first 3 of these are strictly layers of the papilla, but the last 2, although they act as the outer covering of the papilla, are in reality the mucosa and submucosa of the intestine which have extended over the intestinal surface of the papilla.

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* Abstract of thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Graduate Division of Georgetown University, May, 1936.

Only those layers which are directly associated with pathologic changes will be discussed in this paper.

As the duodenal mucosa approaches the base of the papilla its glands become gradually more shallow and are entirely absent as it passes over the tip. In this distal portion the papilla is covered over by intestinal mucosa which is only 1 cell thick and lying on a thin basement membrane. At the edge of the lumen of the papilla this thin layer of intestinal mucosa extends into the inside of the papilla, or strictly speaking, into the ampullary portion, where the cells again take on a columnar appearance and the mucosa is thrown into a most complicated arrangement of folds, and this then becomes the mucosa of the papilla (Fig. 1B).

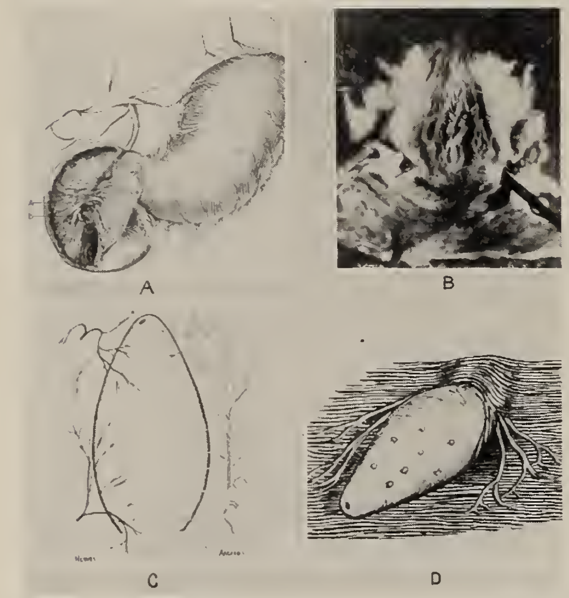

Fig. 1. (A) Location of the major and the minor duodenal papillae; (a) minor papilla; (b) major papilla.
(B) The inside of the papilla, with its longitudinal coursing folds of mucosa.
(C) Diagram showing nerve and blood supply of the major papilla. One diagram is used to represent both, although the nerve and blood supply is the same on both sides.
(D) Diagram of the surface of the papilla, showing a few of the small nodules which have been shown to be the bodies of mucus-secreting glands.

The tips of these folds are seen very often projecting through the lumen of the papilla into the intestine and have a very important bearing on a pathologic process which has been described by me and will be referred to later.

Brief references to the mucosa within the papilla have been made by Matsuno, Helly, Opie, Letulle and Nattan-Larrier, and Mann. These descriptions confirm my own observation concerning the arrangement of the mucosa into folds. The last 2 authors also mention the fact of their occasional projection into the intestine and speak of the folds within the papilla as valves.

The submucosa of the intestine covering the papilla, which is composed chiefly of loosely arranged connective tissue interspersed with a few fibers of smooth muscle, is of interest to us here, only from the standpoint of the various structures that are found in it. Lying in it and passing distally from the base of the papilla toward the tip we find the definitely arranged blood and nerve supply (Fig. 1C). This to my knowledge has never been mentioned in the literature prior to 1935. What is more important than the nerve and blood supply is the presence in this submucosa of numerous small, white, firm nodules which have been shown to be the bodies of mucus-secreting acinar glands. Their secretions are poured into the lumen or ampullary portion of the papilla by way of short necks which pass through and are closely surrounded by the strands of muscle fibers belonging to the papilla (Fig. 1D).

These glands are much more numerous around the opening of the papilla, where on microscopic examination one would not be certain that they do not belong to the intestinal wall instead of in the wall of the papilla.

The submucosa of the papilla itself thins out to an almost imperceptible layer. In it can be seen microscopically, with proper staining methods, very thin layers of smooth muscle fibers which no doubt have a very definite function but which shall not concern us here.

Termination of Ducts

From the literature and from our text-books of anatomy it would appear that the duct of Wirsung and the common bile duct have a constant termination within the papilla. From my own work, which includes a study of hundreds of papillae obtained at autopsy, I am convinced no two individuals have exactly the same termination. The following table represents the variations as seen in 200 cases:

In 104, both ducts emptied separately on the tip of the papilla.

In 24, both ducts united 1 millimeter from the outlet of the papilla.

In 5, both ducts united 2 millimeters from the outlet of the papilla.

In 29, both ducts united 3 millimeters from the outlet of the papilla.

In 23, both ducts united 4 millimeters from the outlet of the papilla.

In 7, both ducts united 5 millimeters from the outlet of the papilla.

In 6, both ducts united 1 centimeter from the outlet of the papilla.

In 1, both ducts emptied separately into the intestine.

In 1, the pancreatic duct passed through the major duodenal papilla, and the common duct passed through a slit-like opening in the wall of the intestine 1 centimeter below the tip of the papilla.

Such an array of irregularities brings up many points for discussion. My chief reason for mentioning them here, however, is that the papilla is said to play a very important part in the production of acute hemorrhagic pancreatitis (Opie, Dardinski). This condition of the pancreas is said to be produced by an impaction of a gall-stone in the papilla in such a way as to produce obstruction to the outlet of the papilla and divert the course of the bile from the common bile duct into the pancreatic duct and thus produce necrosis and hemorrhage. Since the etiology of this condition is still controversial and probably never will be settled, because of the lack of clinical material, we need not discuss it any further.

Inflammation

Gross evidence of inflammation of the major duodenal papilla is more commonly present than we suspect. In 200 cases recently studied 74 presented definite evidence of inflammation. In all of these a marked zone of congestion was present on the surface of the papilla and this congestion covered approximately one third of the structure. It was more marked near the tip and around the opening and gradually faded toward the base. In the lumen of the papilla the congestion was present only around the opening. What was more conspicuous on the inside than the congestion was the large amount of thick viscid mucous secretion which seemed to fill the entire cavity of the papilla, that is, wherever the common bile duct and pancreatic duct united 3 or more millimeters away from the opening of the papilla. Where the 2 ducts opened separately at the tip of the papilla this mucous secretion was more prominent in the common bile duct. In practically all instances this mucus appeared to form a plug at the outlet.

Microscopic examination of these specimens showed a marked leukocytic infiltration in the wall. Polymorphonuclear leukocytes, lymphocytes and plasma cells were present, but the lymphocytes appeared to predominate. Considerable edema was present especially in the submucosal region.

Adenomatoid Hyperplasia

Most pathologists now readily admit that inflammatory adenomatoid hyperplasia occurs in many places throughout the human body. In such locations as the mucous membrane of the gastro-intestinal tract, uterus and nares, it produces diffuse overgrowth, or single or multiple polypoid excrescences which constitute definite clinical entities, and are a feature of the late stages of chronic catarrhal inflammation of these tissues. The process affects both glands and stroma. The glands become hypertrophic or cystic and the lining cells are increased in size and number. The stroma shows new and tortuous blood and lymph vessels, multiplication of stroma cells and infiltration by lymphocytes. The process tends first to produce a diffuse thickening, but focal overgrowth of the tissue edema, venous stasis and mechanical traction lead to papillary and polypoid outgrowths which may become numerous and bulky. In this condition there is a tendency to further overgrowth of the predominating element, glands, stroma or vessels. In the nares the mucous polyps show wide variations in structure, some being glandular, others myxomatous, and still others angiomatous, but the tendency to true tumor growth is slight (Dardinski).

Of the 200 cases studied in this report, 79 presented polypoid swellings of the tips of the folds of mucous membrane seen projecting at the orifice of the papilla together with varying degrees of swelling of the wall of the papilla. Many of these appeared to obstruct the opening of the papilla almost completely, as can be seen in Figure 2.

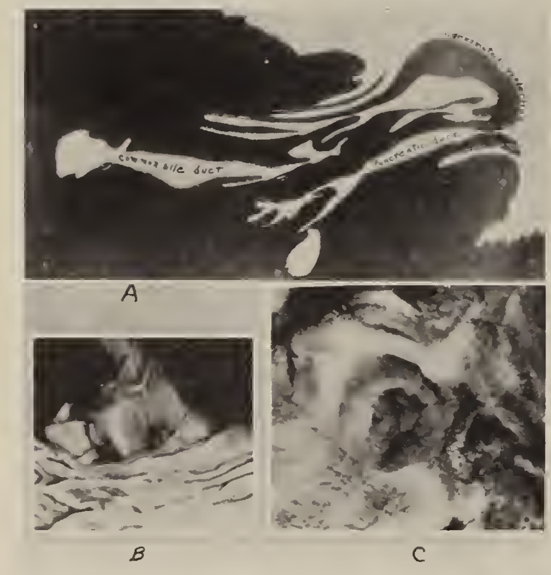

Fig. 2. (A) Photograph of a wax model reconstruction of one of the polypoid growths in the lumen of the papilla. (B) and (C) are photographs of papillae as found at autopsy showing the polypoid growths almost completely occluding the lumen.

The swelling of the wall together with the polypoid growth in the lumen was found microscopically to be due almost entirely to a marked swelling of the mucous glands normally present there and in the folds on the inside of the papilla. The cells of these glands were larger than normal and their distal portions appeared to be filled with droplets of mucous secretion.

Previously this condition had been termed, "inflammatory adenomatoid hyperplasia of the major duodenal papilla in man." Today, after further study, I believe the term "benign" should be prefixed to that title to distinguish it from the glandular hyperplasia seen in malignancies.

ADENOMA

At this point, I feel it is important to distinguish between the true adenoma and the "adenomatoid" condition, in order that the reader may more readily understand what is intended.

By adenoma I mean a benign tumor of glandular epithelium in normal arrangement and with its supporting framework. Once formed it probably never recedes or disappears but remains dormant or continues to grow, terminating, I believe, either in a malignant lesion or remaining as a benign tumor; whereas, the adenomatoid condition in the region of the major duodenal papilla is a benign enlargement due to an inflammatory condition producing an overactivity of the glands which is temporary. After the inflammation subsides the glands may recede to a normal or almost normal condition, and for all intents and purposes the papilla appears to be normal. However, with repeated inflammation and irritation these glands may go on to a true adenomatous growth.

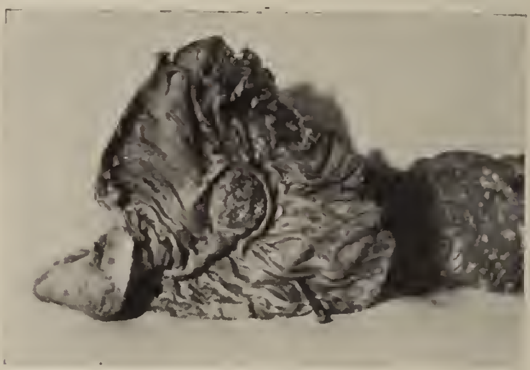

Fig. 3. Photograph of a benign adenoma of the major duodenal papilla as found at autopsy.

True benign adenoma of the papilla (Fig. 3) is rarely seen, chiefly because its occurrence is not suspected clinically. Recently Christopher reviewed the literature on the subject of benign tumors of the extrahepatic bile passages and found 8 benign tumors involving the ampulla of Vater or major duodenal papilla. One of these was called adenoma, 1 polyp, 4 papilloma, 1 carcinoid and 1 melanoma. This appears to be the only report in the literature on this subject. He also reports 1 case of his own which he calls adenoma.

From the location of these benign growths at the exit of the common bile duct probably the first significant clinical sign is jaundice or dyspepsia. These, however, are manifestations of other more commonly seen conditions, and the true condition is very often never recognized. If the patient is operated upon and an anastomosis made between the gallbladder and the jejunum or some other part of the small bowel the condition goes unrecognized. If the patient should happen to come to autopsy the liver, ducts and pancreas are explored but very often the papilla is not. If a benign adenomatous growth should happen to be present which would manifest itself by producing obstructive jaundice, the patient may linger on for a long time and finally die from an intercurrent infection, or the benign adenomatous growth becomes malignant, which is probably the case in many carcinomata of this region.

To substantiate the statements just made I wish to refer to the following clinical history of a patient who was suffering from a benign adenoma involving the major duodenal papilla as seen in Figure 3. The symptoms, course and findings are typical of the majority of these cases.

A negro, aged 62 years, was admitted to Gallinger Municipal Hospital, February 20, 1933. His present trouble had started 2 weeks before admission with anorexia and frequent vomiting. Since then he had been unable to retain any food except milk. Greasy food would cause vomiting within 15 minutes. There was a slight pain along the right costal margin in the region of the gallbladder. Headache and pain in the chest were also complained of together with radiating pain to the right shoulder. Generalized pruritis had been present for the preceding 3 months or longer. This last complaint is most significant in view of the fact that the patient had not noticed any change in the color of his sclerae until his attention had been directed to it when admitted to the hospital. On examination the only significant finding was a generalized jaundice, the duration of which could not be definitely determined, but apparently it had been present for a much longer time than the patient could recall, since he remembered having had pruritis for 3 months. The important laboratory findings were a large amount of bile in the urine, absence of bile salts in the feces, prompt direct van den Bergh with 10.8 mg. per 100 cc. of blood by direct method on first examination. Two weeks later the indirect van den Bergh showed 20 mg. per 100 cc. Four days later another indirect van den Bergh gave a total bilirubin content of 22.8 mg. per 100 cc. In spite of all treatment the jaundice became progressively worse and the patient became gradually weaker. At no time was he in suitable condition for operation. He died 28 days after admission. At necropsy the important finding was complete obstruction of the major duodenal papilla by a papillary adenoma involving the entire circumference (Fig. 3). All the bile ducts and gallbladder were markedly dilated.

CARCINOMA

Although carcinoma of the major duodenal papilla is a rare occurrence it is the most commonly reported condition of this region.

When such a condition is found a question always arises as to its origin. Is it strictly a carcinoma of the papilla, that is, arising in the mucosa on the inside of the papilla or in the glands found in the wall of the papilla, or is it one arising in the duodenal mucosa and involving the papilla? The answer to such a question would not modify the clinical course of the patient or suggest any new method of treatment. From a pathologic standpoint, however, it would be interesting if one were able to determine the exact origin.

According to Ewing, those carcinomata arising in the duodenal mucosa are usually papillary growths which tend to surround the papilla and prove fatal by biliary obstruction and severe infection. Jaundice is an early symptom, although it is less severe and persistent than with carcinoma of the ampulla. It is remittent in character and progressive in intensity. Ulceration of the growth may or may not be present depending upon the size. Metastasis to the regional lymph nodes and liver rarely occurs, chiefly because the degree of malignancy is not great and secondly because liver damage occurs with a fatal outcome before metastasis has had time to eventuate.

Here I wish to call attention to the possibility of carcinoma arising in the glands found in the wall of the papilla (Fig. 1D). This, to my knowledge, has never been mentioned before, chiefly because the glands had never been described before 1935 (Dardinski).

The following case report is typical of this condition:

A white man, 45 years of age, was admitted to the Margaret Pillsbury General Hospital, Concord, N. H., with a history of jaundice of 5 months' duration and a temperature ranging from 94°F. to 104°F. He died soon after admission and before complete study had been made. At autopsy a cauliflower-like tumor 3 cm. in diameter was found involving the major duodenal papilla, which completely obstructed the lumen. The intrahepatic and extrahepatic bile ducts were markedly dilated, and numerous areas of necrosis were seen throughout the liver. No gallstones or metastases were found. Microscopically the tumor was a malignant adenocarcinoma of low grade. The liver showed a chronic suppurative cholangitis with many cholangitic abscesses.*

DISCUSSION

Inflammation, benign inflammatory adenomatoid hyperplasia, adenoma, and adenocarcinoma are the chief pathologic conditions of the major duodenal papilla seen macroscopically in the human.

The frequency with which inflammation occurs and the lack of a definite term by which it may be designated suggests the plausibility of naming this condition with a logical descriptive term. I feel, therefore, that "catarrhal duodenopapillitis" is the best term to use, because it not only describes the character of the pathology but also indicates its location.

From a clinical standpoint this condition is probably related to the condition which is known as "catarrhal jaundice." It gives us some logical basis for an explanation of why such conditions clear up quite readily under treatment.

There is no doubt that a certain amount of mucous secretion is present in the papilla under normal conditions, but with an added inflammation it is not difficult to conceive of an added amount of secretion and a resulting obstruction. The condition can be compared quite readily to a catarrhal inflammation of the nasal cavities.

The benign inflammatory adenomatoid hyperplasia is not found as often as inflammation. When present, however, there is usually some evidence of irritation which may be manifested macroscopically by congestion, excess mucous secretion and edema, or microscopically by cellular infiltration.

What effect these papillary growths have on the flow of bile has not yet been determined. At least no evidence from autopsy material has been found that would suggest obstruction.

It is important, however, to bear in mind that in the presence of repeated inflammation such a benign adenomatoid hyperplasia may result in a true adenoma.

When an adenoma develops the clinical course of the patient is obvious. The outcome will depend upon the duration of the obstruction and whether or not a malignant change has occurred.

Such a sequence of events is not surprising. What is rather remarkable, however, is the frequency with which inflammation and adenomatoid hyperplasia occur and the rarity with which adenoma and adenocarcinoma are found. One cannot disregard the fact that bile is constantly present in this region, and this suggests the thought that bile may have some controlling influence on tissue growth.

CONCLUSIONS

From this study the evidence suggests a logical course of events concerning the pathologic changes occurring in the major duodenal papilla in man. Inflammation which gradually leads to an adenomatoid hyperplasia and this, in turn, to a true adenomatous growth, may prove fatal to the patient while in a benign state or may go on to a malignant change.

This study further suggests that patients who give a history of repeated attacks of jaundice, without evidence of stones, and who are resistant to the usual forms of treatment, should be watched carefully and should be considered candidates for surgical investigation.

The term "catarrhal duodenopapillitis" is suggested for inflammation of the major duodenal papilla, which is a definite pathologic condition. It may or may not manifest itself clinically by jaundice.

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* I wish to express my appreciation to Dr. R. J. Graves of Concord, N. H., and Dr. R. E. Miller of Hanover, N. H., for permission to use this case and material in this paper.

BIBLIOGRAPHY

Christopher, F.: Adenoma of the Ampulla of Vater. Surg., Gynec. & Obst., 1933, **56**, 202.

Dardinski, V. J.: Inflammatory Adenomatoid Hyperplasia of the Major Duodenal Papilla in Man. Am. J. Path., 1931, **7**, 519.

Dardinski, V. J.: The Anatomy of the Major Duodenal Papilla of Man, with Special Reference to its Musculature. J. Anat., 1935, **69**, 469.

Dardinski, V. J.: Hemorrhagic Pancreatitis; Report of 2 Cases in Which Gallstones Could Not Be Considered Essential Etiological Factors. Am. J. Path., 1931, **7**, 169.

Ewing, J.: Neoplastic Diseases, a Text-book on Tumors. Philadelphia, Saunders, 1928.

Helly, K. K.: Beitrag zur Anatomie des Pankreas und seiner Ausführungsgänge. Arch. f. mikr. Anat., 1898, **52**, 773.

Letulle, M., and Nattan-Larrier, L.: Région vatérienne du duodénum et ampoule de Vater. Bull. Soc. anat. de Par., 1898, **73**, 491.

Mann, F. C.: A Comparative Study of the Anatomy of the Sphincter at the Duodenal End of the Common Bile Duct with Special Reference to Species of Animals without a Gallbladder. Anat. Rec., 1920–21, **18**, 355.

Matsuno, Y.: Ueber die Muskulatur des Ductus choledochus. Virchow's Arch. f. path. Anat., 1923, **247**, 208.

Opie, E. L.: The Anatomy of the Pancreas. Johns Hopkins Hosp. Bull., 1903, **14**, 229.

Opie, E. L.: The Relation of Cholelithiasis to Disease of the Pancreas and to Fat Necrosis. Am. J. M. Sc., 1901, **121**, 27.

Vater, A.: Diss. anatomica qua novum bilis diverticulum circa orificium ductus choledochi ut et valvulosam colli vesicae felleae constructionem ad disceptandum proponit atque singularis utriusque structurae eximiam utilitatem in via bilis determinanda proponit. Resp. Paulo Gottlob Berger. Wittenbergae, lit. Gerdesiansis, 1720. (P., v. 1914.)

POSTOPERATIVE PNEUMONIA: CAUSE, PREVENTION AND TREATMENT

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Postoperative pulmonary complications are of interest both to surgeons and to internists, because the former wish to know how to avoid them and the latter are often called upon to treat them. In addition to the relatively rare embolic pneumonias and lung abscesses, postoperative complications affecting the lungs are usually divided into bronchitis, bronchopneumonia, lobar pneumonia and pulmonary collapse; but it would probably be more accurate to say that we can find all gradations of diminished aeration, from the mere elevation of the diaphragm to the collapse of an entire lobe, and all degrees of infection, from a mild bronchitis, through the lesser to the more severe pneumonias involving entire lobes, or any combination of the two factors of lessened aeration and infection.

Different authors give different figures for the incidence of these complications, varying from 1 to 5 per cent of all patients operated upon. Using the figures, however, of the writers who have studied their cases most carefully, we can safely assume that 1 out of every 20 patients operated upon, and 1 out of every 10 who have an abdominal operation, will develop some type of pulmonary complication.

CAUSE

A consideration of the various factors operating to cause these complications should give us an insight into the possibilities of prevention and treatment.

It is well known that the incidence of postoperative pulmonary complications is greater in patients who have had abdominal operations and especially operations upon the upper abdominal viscera. This is explained by the fact that after these operations there is immobilization of the abdominal muscles together with elevation of the diaphragm. The latter is sometimes as much as 6 or 8 inches above the normal level.

The vital capacity of the lungs is correspondingly reduced. Churchill and McNeil showed that patients who were subjected to a lower abdominal operation sustained a 50 per cent reduction of the vital capacity below its preoperative level, while those whose gallbladders were operated upon had an 85 per cent reduction in the vital capacity. These changes were at their height about 24 hours after operation, returning gradually to the normal preoperative level over a period of 1 to 3 weeks.

As a corollary, respirations are faster and shallower because of the lessened movements of the thoracic muscles and diaphragm.

The end result of this combination of factors is compression of the lungs, especially of the lower portions. This may be seen in roentgenograms taken during the 24 or 48 hours immediately after operation, as increased density of trunk markings, triangular shadows of atelectasis at the peripheral ends of the bronchi, or even collapse of one or more lobes. The seriousness of the phenomenon rests upon the fact that it prevents the normal mechanism of expulsion of secretions and offers a favorable focus for the proliferation of the bacteria contained in them.

There are other alterations in the physiologic state which contribute to lung complications after operation. Debilitated states probably exert a deleterious influence in two ways—through the general lack of resistance of the debilitated person, and also through the fact that he is likely to lie in one position over a long period of time, hindering the proper drainage of secretions from the bronchioles.

Exposure to cold will lower the resistance of the respiratory tract, probably by constriction of the smaller blood vessels, particularly when it comes, as it often does, to a patient who is sweating profusely and is unable, under the influence of the anesthetic, to regulate his own body heat properly.

This brings us to the other major factor in the development of postoperative pulmonary complications—bacterial infection. Studies of the nasopharynx in normal persons have shown that about 30 per cent of people carry pneumococci in their throats at any one time. These carrier strains are, with few exceptions, Types III through XXXII. Patients who are operated upon harbor them likewise, as shown in the studies of Whipple, Cleveland, and Sutliff and Steele, a finding which I have been able to confirm in my investigation of surgical patients at the George Washington University Hospital. Since the majority of these pneumococci are relatively less virulent than Types I and II pneumococci, they produce disease in the carrier only when his resistance is lowered.

On the other hand, Types I and II pneumococci are found in less than 1 per cent of the throats of normal persons, and even then are carried only for a day or two. If a person inhales these organisms in potential doses, he is almost certain to respond with pneumonia.

Cleveland showed that, out of 47 patients with postoperative pneumonia, the same type of organism was found in the throat beforehand as was isolated from the sputum after operation in 15 patients, or 32 per cent. Infection in these patients was undoubtedly endogenous, and might be explained by Lemon's demonstration that a dye, dropped into the mouth of an anesthetized dog, at the same rate as that of the salivary secretion, was aspirated all the way into the alveoli. Bacteria introduced in the same manner could likewise be cultured later from the remote periphery of the lungs.

The remaining 68 per cent of patients with postoperative pneumonia, who had either no potentially pathogenic organisms in their throats before operation, or had a different type after operation than before, were apparently infected from without.

The links in the chain of circumstances through which an unfortunate patient develops a postoperative pulmonary complication, are, accordingly, as follows: the presence of potentially pathogenic bacteria in the nasopharynx (usually pneumococci of Types III to XXXII), or the inhalation from carriers of any of the types of pneumococci, when the patient has a lowered general resistance and particularly a lowered lung resistance.

Prevention

Prevention must aim at breaking the weak links of the chain. The diminution of lung volume is hard to alter. Inhalations of carbon dioxide and oxygen after the operation have been advocated, upon the theory that the lung is stimulated to greater expansion. However, King, reporting a carefully controlled series of cases in which alternate patients were treated with carbon dioxide, found no appreciable difference in the percentage of pulmonary complications in the 2 groups: 20.8 per cent, in the patients receiving carbon dioxide, and 20.5 per cent in those who were not given this treatment.

The studies of Carlson seem to explain clearly this negative result. He showed by pneumographic tracings that the excursions of the abdominal muscles were decreased in amplitude after operations, but that inhalations of carbon dioxide increased the amplitude for only a few moments. Within 2 to 5 minutes after the administration was discontinued, the abdominal respirations were again as shallow as before. Studies of the effect of continuous carbon dioxide administration for 24 or 48 hours after operation would be welcomed. Until then, we have no evidence of satisfactory results from its use.

After the patient is in his own bed he should never be allowed to remain in one position for any length of time, but should be shifted from side to side at least twice an hour during the day. This detail may seem too unimportant to require much attention, and yet it is probably the most helpful factor in causing the lungs to expel secretions accumulated during the operation. King found a definitely smaller number of postoperative pulmonary complications when patients received a frequent change of position than when this detail was neglected.

In addition, we must strike at the infectious links of the chain. Only the most urgent operations should be done in the presence of an acute upper respiratory infection. Even a chronic respiratory infection should be investigated before an abdominal operation is undertaken, and cleared up first, if possible. Webster and Hughes showed that chronic carriers of pneumococci were subject to respiratory tract symptoms and antrum disease, and that there was a direct relation between the degree of symptoms, amount of clouding of the antra and the number of organisms contained in the nose and throat cultures.

This still leaves unanswered the question of how far to go in the prevention of exogenous infections. Perhaps the day will come when we will be strong enough in our convictions to exclude any one having a respiratory infection from the vicinity of the patient before, during, and after the operation. Certainly, the fact that over two thirds of the causative agents of a large series of postoperative pneumonias could not be found in the patient's own pharynx before operation is a strong argument. Then, too, Smillie has shown that other members of the family of a patient with pneumonia carry the same type of pneumococcus in their throats as is causing the patient's disease. At present, however, perhaps the best that we can do is to insist that physicians, nurses and visitors with acute respiratory infections remain away from the patient for the first 4 or 5 days after operation, and that all attendants suffering from acute pharyngitis be kept off duty.

One other possibility of prevention remains, namely, vaccination. Methods of intracutaneous injection with very small amounts of pneumococcus fractions may make it possible to vaccinate at one time with all the strains of the pneumococcus, thus conferring an immunity against practically all the incitants of postoperative lung infections (Felton, Sutliff and Steele; Finland and Dowling). One small intradermal injection of the type specific carbohydrate has been found to confer immunity in the majority of subjects lasting for from 8 weeks to 1 year or more. The simplicity of the technic and the absence of unpleasant side reactions make this a particularly acceptable method. However, the work of Ross, showing that pneumococci administered orally will bring about immunity in patients which compares favorably with that following injections, introduces another feasible method of vaccinating against all the types of pneumococci simultaneously.

Treatment

Once a postoperative lung infection has developed, it demands the same treatment as any other pneumonia. The sputum should be typed in every case, for, although the percentage of cases caused by the types of pneumococci for which serum is available (Types I, II, V, VII and VIII) comprises only about 60 per cent of all pneumonias in the District of Columbia, yet this serum may be life-saving when it can be used.

In addition, the treatment consists of frequent change in posture, and oxygen and digitalis when indicated. Because a great number of postoperative pneumonias are caused by relatively avirulent organisms and, therefore, run a mild course, the prognosis is often fairly good. However, as has been stated above, the optimal results will come when the correct knowledge of the cause leads to the combination of wiser prevention and more diligent treatment.

BIBLIOGRAPHY

Carlson, H. A.: Inhibition of Respiration as a Factor in the Pathogenesis of Postoperative Pulmonary Complications. J. Thoracic Surg., 1932, **2**, 196.

Churchill, E. D., and McNeil, D.: The Reduction in Vital Capacity Following Operation. Surg., Gynec. & Obst., 1927, **44**, 483.

Cleveland, M.: Further Studies in Postoperative Pneumonitis. Surg., Gynec. & Obst., 1919, **28**, 282.

Felton, L. D., Sutliff, W. D., and Steele, B. F.: Antigenic Characteristics in Man of Certain Products of the Pneumococcus; Comparison with Vaccine. J. Infect. Dis., 1935, **56**, 101.

Finland, M., and Dowling, H. F.: Cutaneous Reactions and Antibody Response to Intracutaneous Injections of Pneumococcus Polysaccharides. J. Immunol., 1935, **29**, 285.

King, D. S.: Postoperative Pulmonary Complications; Carbon Dioxide as a Preventive in a Controlled Series. J. A. M. A., 1933, **100**, 21.

Lemon, W. S.: Aspiration; Experimental Study. Arch. Surg., 1926, **12**, 187.

Ross, V.: Oral Immunization of Humans Against the Pneumococcus. J. Immunol., 1934, **27**, 307.

Smillie, W. G.: The Epidemiology of Lobar Pneumonia; a Study of the Prevalence of Specific Strains of Pneumococci in the Nasopharynx of Immediate Family Contacts. J. A. M. A., 1933, **101**, 1,281.

Sutliff, W. D., and Steele, B. F.: Relationship of Infection to Postoperative Pulmonary Complications. Arch. Surg., 1935, **30**, 14.

Webster, L. T., and Hughes, T. P.: The Epidemiology of Pneumococcus Infection; the Incidence and Spread of Pneumococci in the Nasal Passages and Throats of Healthy Persons. J. Exper. Med., 1931, **53**, 535.

Whipple, A. O.: A Study of Postoperative Pneumonitis. Surg., Gynec. & Obst., 1918, **26**, 29.

ANALYSIS OF A HEALTH SURVEY OF 1,193 SCHOOL CHILDREN IN THE DISTRICT OF COLUMBIA*

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The trend of modern medicine is toward preventive and hygienic improvement of the population. With the advance of medical science the life span has been increased considerably. On the other hand, because of this medical progress many individuals with different hereditary taints have survived and indirectly cause an increase in chronic ailments. The intensity of modern life with its economic strains and stresses play an important rôle in shaping the physical and mental make-up of the population. In analyzing approximately 1,200 children, we encountered numerous paradoxes which may be attributable to environmental influences, economic depression or hereditary defects (Table 1).

The youngest group of pupils examined (Junior High School) ranged from 10 to 17 years of age. The older group (Senior High School) ranged from 14 to 21 years of age. In the former group the greatest number of pupils were from 12 to 14 years old, and the 13-year-old group predominated. In the older group the greatest number of pupils were from 15 to 17 years old with the 16-year-old group predominating. In the younger group, 89.4 per cent of students were found defective. The percentage of defectives were distributed about equally among the girls and boys. In the 13-year-old group the defectives were proportionately greater, running about 33.8 per cent of the 89.4 per cent.

In the older group of students, 78.9 per cent were found defective. The percentage of defectives among girls in that group was about 22 per cent higher than among boys. The largest percentage of defectives was in the 16-year-old class.

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* From the School Inspection Service, Health Department, District of Columbia, 1936.

The paradoxical finding of 10.5 per cent more defects in the younger group than among the advanced-in-age students, has to be explained on the basis of the economic depression of 1929, since the social and racial background of both groups is about the same. For the basis of our supposition we take the largest defective age group in both schools, 13 and 16 years, respec-

TABLE 1

Comparative Health Table of Students of Tenth Grade, McKinley High School, and Students of the Seventh Grade, Langley Junior High School

		Langley Junior High School				McKinley High School			
		Boys		Girls		Boys		Girls	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Number examined		192		173		467		361	
Age									
Defective Age Group	10	1	0.5						
	11	5	2.6	4	2.3				
	12	48	25.0	42	24.3				
	13	61	31.8	61	35.2				
	14	36	18.8	36	20.8	18	3.8	28	7.7
	15	19	9.9	8	4.6	96	20.5	112	31.0
	16	2	1.0	2	1.2	134	28.6	135	37.3
	17			1	0.6	49	10.5	36	9.9
	18					19	4.0	4	1.1
	19					3	0.6	3	0.5
	20					1	0.2		
	21							1	0.2
Healthy Age Group	11	2	1.0	1	0.6				
	12	7	3.6	6	3.5				
	13	8	4.2	9	5.2				
	14	2	1.0	3	1.7	8	1.7		
	15	1	0.5			43	9.1	18	4.9
	16					65	13.0	17	4.7
	17					18	3.8	7	1.9
	18					11	2.5		
	19					2	0.4		
Dental defects		94	42.7	74	42.8	189	40.5	148	40.9
Total visual defects		75	39.0	78	45.0	73	15.6	86	21.5
Uncorrected visual defects		75	39.0	78	45.0	61	13.6	68	16.0
Corrected visual defects						12	2.6	18	4.9
Other eye diseases		4	2.1	5	2.8			14	3.8
Nutritional deviations		64	33.3	79	45.0	115	24.6	168	46.5
Subnormal weight		48	25.0	46	26.6			114	31.5
Obesity		16	8.3	33	19.1			54	14.8
Orthopedic and postural defects		48	25.0	56	32.9	89	19.0	138	38.8
Ear defects		4	2.1	5	2.9	32	6.9	30	8.3
Tonsillitis		14	7.2	7	4.0	16	3.4	11	3.8
Cardiac disease		4	2.1	13	7.5	18	3.9	11	3.8
Nasal defects								10	2.8
Pulmonary disease		1	0.5	5	2.8	12	2.6	6	1.7
Anemia		3	1.5	3	1.7			7	1.9
Hernia						10	2.1		
Thyroid enlargement								7	1.9
Restrictions		5	2.6	15	8 6	60	12.8	18	26.7

tively. In the years of 1929 to 1932, the peak of the depression, these children were 5 to 8 years old and 9 to 12 years old, respectively. It is reasonable to suppose that the age period of 5 to 8 years is far more vulnerable than the age period of 9 to 12 years to the insufficient and lower grade of diet during an economic depression. In the latter part of this paper we shall have more proof of this assertion. The reason the girls were more defective in the high school age than the high school boys or the junior high school girls may be attributed to their physiologic maturity and resulting effects. If we assume that nutrition played an important rôle in the production of these defects, the triad of dental defects, nutritional deviations, and anemia occupied the greatest fraction of total health deflections. The dental defects took the lead, occurring in 41.7 per cent of the 1,193 students, being about 2 per cent higher in the younger group. Nutritional deviations were greater among the girls than the boys. This occurred in 39.1 per cent of the junior group and 35.5 per cent of the senior group. The majority of the nutritional deviations was in the subnormal weight class. We observed with interest the 113 per cent decrease of obesity in the senior group as compared with the junior group, which can be attributed to the sex consciousness and resulting effort to improve one's looks by reducing.

Anemia occurred in about 2 per cent. To this group belonged children whose paleness was obvious on inspection, and, therefore, this group has a great margin of error.

The next largest class was the defective-vision group, with 42 per cent for the junior students and 23.5 per cent for the senior students. The girls in both groups had 6 per cent more defective vision than the male pupils, the reason being given by their teachers that as a whole the girls study longer at home in the evenings under artificial light. We have investigated the reason for the 18.5 per cent increase in visual defects in the junior group and have found that the average light at Junior High School is equal to 6 foot candles, ranging from an average of about 2.5 foot candles farthest from the window to about 10 foot candles nearest to the window. In the Senior High School the average light was equal to 14 foot candles, which was quite adequate since 10 foot candles are taken as a basis for proper minimal light. The poor light in Junior High School classes was further deprived by shades and variety of green flora on window sills. The number of visual defects was largest in the 20/30 group. The group from 20/70 to 20/200 and less belongs probably to the congenital myopia class. Girls in that class are more affected than the boys, and the senior group more than the junior one, with 21.2 per cent for the junior group and 40.7 per cent for the senior group. In the junior defective-vision group none had glasses which corrected their defect. In the senior group 3.7 per cent of all defective vision was corrected by proper glasses.

The third largest defective class was one with orthopedic and postural defects. These defects among boys decreased with advancing age, probably due to increased athletic activities. Girls, on the other hand, have an increase of these defects with advanced age. Development of breasts, high heel shoes, less athletics than the boys, and greater tendency to study may have an influence upon this increase. The junior group contained 28.9 per cent and the senior group 23.9 per cent with these defects.

The fourth largest defective group consisted of deviations which can easily be corrected and it is not a representative group. To this classification belong other eye diseases, tonsillitis, hernia, ear defects (usually impacted wax), and nasal defects. This group represents 7.8 per cent in the junior class and 15.5 per cent in the senior class of total defects.

To the last group belong those pupils whose defects should be further investigated, namely, the pulmonary, cardiac and thyroid deflections from the normal. This class is very small constituting 6 per cent of all defects for the total 1,193 pupils examined.

Of the junior group 5.6 per cent and of the senior group 19.7 per cent had to be restricted in their physical activities pending correction of their defects.

SUMMARY

1. One thousand one hundred and ninety-three (1,193) school children of both sexes ranging from ages 10 to 21 years were examined.
2. The largest defective group could be attributable to nutritional inadequacy and consisted of dental defects, malnutrition, obesity, and anemia.
3. The second largest group consisted of visual defects due to congenital and acquired causes.
4. The third largest group consisted of orthopedic and postural deviations.
5. The fourth group embraced defects easily corrected, such as, wax in ears, septal deviations, conjunctivitis, tonsillitis, and hernia.
6. The fifth group represented thyroid, pulmonary and heart diseases. This group should be under further observation.
7. Restriction from physical activity was considered advisable in 5.6 per cent of the junior group and in 19.7 per cent of the senior group.

CONCLUSIONS

1. Groups 1, 2, and 4 belong to the class which under proper attention can and should be corrected.
2. Group 4 should have their eyes corrected by proper glasses. Frequent inspection of classrooms should be made in order to see that there is a minimum of 10 foot candles in every part of the classroom, to fulfil the proper light requirement of normal eyesight.
3. Periodic examination of all school children and calling parents' attention to the necessity and importance of correcting any or all preventable defects is worth while.

SUCCESSFUL TREATMENT OF MASSIVE AIR EMBOLISM

REPORT OF A CASE

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REPORT OF CASE

The patient entered the hospital on October 24, 1933, because of a severe injury which occurred in a coal mine (Case No. A2517). Examination revealed that he had a compressed fracture of the first lumbar vertebra with involvement of the spinal cord at that level. During the period of hospitalization he was given intravenously 5 per cent glucose in normal saline frequently. The flask used for this purpose had a capacity of 1,400 cubic centimeters and was equipped so that compressed air could be used to force the fluid into the vein. On the evening of December 15, 1933, an intravenous administration was being supervised by a graduate nurse. Just before the administration had been completed she was called to another room by the cries of a patient. Without giving instructions she passed the flask to an orderly, who began to pump air into the flask vigorously without regard to the diminishing volume of the solution. As soon as all the solution had disappeared an enormous volume of air rushed through the needle into the vein producing a hissing noise, according to the orderly. Immediately the patient became cyanotic and unconscious. The author was called and he reached the bedside within 4 minutes after the incident. The needle had been withdrawn from the vein by the nurse. The patient was extremely cyanotic and pulseless. He was breathing very slowly, probably 4 to 6 times a minute. The inspiration was deep and long and expiration was even longer. There was a considerable interval between expiration and inspiration which would cause one to think that each expiration would be the last one. Momentary auscultation over the cardiac region revealed some unfamiliar sound which indicated that the heart was probably still active. Immediately the blood in the arm was milked distally, thus making the veins visible; the needle was reinserted into a vein, and normal saline was forced through the needle by compressed air. Within 2 or 3 seconds the normal color of the patient had returned, and he had become conscious. The intravenous administration was continued until 3,000 cubic centimeters of the fluid had been given, although the patient appeared normal after a few minutes, even before the first liter had been used. The pulse rate had increased from 120 beats to the minute prior to the incident to 140 beats after the saline had been administered. The blood pressure was not determined until the next morning, at which time it was 120 systolic and 70 diastolic, which was normal for this patient. There was no appreciable rise in temperature. During the preceding 4 days the average temperature had been 99°F.; the average pulse rate had been 112 each minute; and the average respiratory rate had been 22 each minute. During the 4 days following the incident the average temperature was 99.2°F.; the average pulse rate was 115 each minute; and the average respiratory rate was 22 each minute. The hemoglobin content of the blood remained unaltered. In no way could it be ascertained that the general condition of the patient had been made worse. He was discharged from the hospital on April 7, 1934. He is perfectly normal and healthy now (August 2, 1936) except for some residual palsy of the anterior group of muscles of the right leg which resulted from the cord injury inflicted at the time of the accident in the mines.

COMMENT

This case is reported to introduce the method used for treatment. It is believed that the patient would have died within a few minutes if nothing had been done to remove the air from the right chambers of the heart. The volume of air under normal atmospheric pressure which entered the vein is unknown, but it was certainly considerable. The normal saline which was forced into the vein afterward pushed onward the column of air obstructing the vascular system and thus filled the right chambers of the heart with fluid which enabled this organ to function effectively. The large volume of normal saline was given with the idea of keeping the air embolism moving and thus to disseminate it and to promote its absorption. One liter of the normal saline might have been adequate. I believe the method of treatment used in this case was more effective and less dangerous than the method of attempting to aspirate the air from the right chambers of the heart with a needle and syringe.

The patient stated, "I suffered no pain whatever, but immediately after I heard the hissing noise of the air rushing through the needle into the vein, I felt myself 'sinking' and felt sure that I was dying. When I came to myself I felt as though I was being aroused from a deep sleep."

It would appear from a consideration of this case that the pathologic changes which occur in the vascular system as a result of the presence of a large volume of air is not sufficient to cause death or any permanent harmful results. Furthermore, it would appear that some calamities may be avoided during surgical operations on the chest or neck if intravenous administration of normal saline is instituted at the beginning of the operation; the flask should be so equipped that compressed air may be used to force the fluid into the vein rapidly to disseminate the air embolism if such occurred.

CONCLUSIONS

1. Compressed air should not be used to force fluids into the vein ordinarily. When used it should be supervised by the physician in charge of the patient.
2. A patient suffering with an apparently fatal air embolism may be successfully treated by forcing normal saline rapidly into a vein by means of compressed air.
3. The pathologic changes in the vascular system caused by a large volume of air are not sufficient always to cause death or any permanent damage.

Trichinosis. A Report of Twelve Cases Occuring in Colorado.—Trichinosis is an acute condition caused by Trichinella Spiralis and is characterized by remittant fever, edema of the face, pain and soreness in the muscles, and emaciation. Anatomically, the larval worms are found in the muscles.....

Laboratory Findings.—Frequently the first suspicion of trichinosis is aroused by the return of a routine blood count containing a high per cent of eosinophiles. It tends to be higher than in any other condition, usually 30 per cent, and frequently higher—even 80 per cent. The degree of eosinophilia does not depend on the severity of the infestation except in fatal cases. McDonald and Wadell, however, reported cases of trichinosis with low or absent eosinophilia. Opie, working with guinea pigs fed with trichinous meat, felt there was no constant alteration of eosinophiles until the end of the second week when a rapid increase occurred. He found that infestation with large numbers of parasites caused a rapid diminution of eosinophiles and was rapidly fatal; whereas mild infestation stimulated large numbers of these cells. Also, that the number of eosinophiles always decreased before death usually to less than 1 per cent.

Within the first few weeks of the disease, it is sometimes possible to recover the adult parasites from the stools or the embryos from the circulating blood or spinal fluid. After the ninth or tenth day, it may be possible to find the embryos in a biopsy specimen of striated muscle.

The skin and precipitin tests are the newer laboratory aids. They were demonstrated by Bachman in 1928. Both are valuable aids in diagnosis, but cannot be considered certain diagnostic tests. The precipitin test can be detected about a month after infestation. The skin test is performed by intradermal injection of the antigen. It gives an immediate reaction, occurring within 5 to 15 minutes, and fading in 1 to 2 hours. McCoy, Miller, and Friedlander demonstrated that about 90 per cent of persons ill with trichinosis will give a positive skin test, providing the disease is sufficiently established, i.e., 2 to 3 weeks after infection. McCoy, et al, have modified Bachman's method of preparation of the antigen used in these tests. You are referred to these authors for technic. . . .

Discussion.— . . . In this series of cases the maximum eosinophilia ranged from 10 per cent to 57 per cent and bore no relation to the severity of the symptoms. . . . Only one of the patients presenting symptoms was severely ill. Ten days after admission to the hospital her respiration became rapid, shallow, and painful. She became cyanotic and required oxygen for 4 days. No evidence of pathology in the chest was found to account for these symptoms, either on physical examination, or in the X-ray. Probably the respiratory difficulty was secondary to trichinous involvement of the diaphragm and the intercostal muscles. The intradermal test was performed on 6 of the hospitalized cases. Four were markedly positive in 1/10,000 dilution, 1 negative in 1/10,000 dilution but definitely positive in 1/500 dilution, and 1 was negative in both dilutions. A like number of controls were run on members of the hospital staff, all of which were negative.

The search for parasites was not very successful. The circulating blood was examined for trichinellae in 6 cases, the stools in 2, and the spinal fluid in 1; but no parasites were found in any of them. Positive biopsies were obtained in only 2 cases and negative biopsies in 4 cases. Second biopsies were performed in 4 cases, but parasites were found only in 1. . . . .

Extract from article by CHARLES J. STETTHEIMER, M.D., Denver, *Colorado Medicine, December,* 1936, p. 880.

MEDICINE IN BRAZIL*

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At the invitation of Dr. A. A. Moll, secretary of this Chapter, I came here to tell you something about Brazilian medicine and physicians. But first, I present my excuses for my halting English, acquired in these 5½ months that I have been in this country. Unfortunately, because of this handicap and the business of moving to New York last week-end, in accordance with the program of my postgraduate course, it was not possible to prepare a more elaborate address.

In Brazil medicine is very advanced. For more than 100 years it has been officially taught. In all the branches of the medical science, we have a long list of distinguished physicians whose works are known and appreciated.

Our country has 10 medical schools, 6 connected with universities. Almost all the schools are official; the others are recognized by the Government. The medical course is completed in 6 years. Students can practice in the hospitals after the second or third year. The best school of medicine, in buildings and facilities, is in the state of São Paulo, built by the Rockefeller Foundation and helped by the local government. It is the best in South America and one of the best in the world. This is the opinion of all the foreign physicians who visit it. The University of Rio de Janeiro has also a good medical school, equipped with fine experimental laboratories and comfortable amphitheaters. From all the medical schools every year about 1,000 doctors graduate, which number is not too great for a country with about 45,000,000 inhabitants and more than 5,000,000 square kilometers in area.

Although we have solved many sanitary problems we have yet much to do, principally inland. Brazilian medicine has been influenced more by European schools than others. We have many physicians who have studied in Europe, principally in France, Germany and Austria. Almost all our medical books are printed in French. French professors of medicine have visited constantly in Brazil; others from Brazil have visited France for scientific conferences.

Brazil has a great number of hospitals, but there are not enough. Almost all the hospitals belong to the Government; there are some private ones, too. We have some very good hospitals, with modern furniture, principally in the central and southern parts of the country. Now, in the Federal District, are being built 5 or 6 new large hospitals by the local administration for the poor population. The best medical institution in many states of Brazil is the Municipal Assistance, for emergency cases. It gives aid to the patients at the scene of the accident a few minutes after being called, without charge. In cases requiring an emergency operation, they transport the patient to a special hospital. This is a service of the city and it is the only service of its kind in the world.

Many scientific institutes of research, with devoted groups of physicians, produce very much. In parasitology and tropical medicine, we have a wonderful institution, Oswaldo Cruz Institute. For the study of snakes and their venoms, we have the Butantan Institute. Its present director, Dr. A. Amaral, organized this service. Many others can be found in Brazil, but these two are the best, and without their equals in the world. The first is in Rio de Janeiro and the second in São Paulo.

I would like now to cite some names of Brazilian physicians who have won international reputations by their works. In medicine there was Francisco de Castro, the prince of medicine, who combines with his large scientific attainments, great qualities as a writer. Miguel Perëira was one of the first sanitarians of Brazil. Torres Homem's personal methods of examination and treatment are yet followed. Miguel Couto, called the master of masters, who recently died, was the biggest name in Brazilian medicine. His kindness was well known. "He cried," said his widow, "when he lost a patient." He taught medicine in the University of Rio de Janeiro for more than 30 years. Almost to the end of his life he was active in politics, having contributed efficiently in the formation of our Constitution, as a deputy-elect, for a large number, in two states. Rocha Faria was a fine internist also. In public health we had Oswaldo Cruz, one of the greatest glories of the country. Thirty years ago he rid Brazil of yellow fever, which had given our country an evil reputation among foreigners. Carlos Chagas, a hygienist, was also a pupil of Cruz. He discovered a trypanosomiasis called Chagas' disease. The infectious agent is the Trypanosoma cruzi, and the transmission is made by a certain mosquito. Carlos Seidl was also a good hygienist. In microbiology and parasitology, I would like to mention Dionysio Cerqueira, discoverer of a very good method of staining the bacillus of tuberculosis. Lemos Monteiro, from São Paulo, died about 2 months ago. His work at the Butantan Institute is known by the members of the last Congress of the Pan American Medical Association held in Brazil. Pereira Filho, from Rio Grande do Sul State, was also famous for his work. In surgery we had Chapot Prevost a good surgeon, famous for an operation performed in a case of Siamese twins, saving both lives. Nabuco de Gouvea, surgeon as well as diplomat, represented the country in many foreign posts. Paes Leme and Domingos de Goes were professors in surgery and anatomy of the medical school in Rio de Janeiro. Erico Coelho was an outstanding obstetrician, Carvalho Azevedo, a fine gynecologist. Juliano Moreira and Teixeira Brandão were excellent psychiatrists, Nascimento Gurgel and Fernando Figueira were splendid pediatrists. Faustino Esposel, neurologist, and many others whose pupils and works live to perpetuate their memories.

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* Address delivered before the Washington, D. C., Chapter of the Pan American Medical Association, January 26, 1936.

Of the living physicians, I cite Silva Santos a great contemporary anatomist. He is retired now. He has made many contributions to this branch of the medical science. His son, Maurity Santos, is one of the best known Brazilian surgeons. He was very much appreciated by the members of the last Pan American Medical Congress. Alvaro Osorio de Almeida, physiologist, is trying to resolve the great problem of curing cancer. He has his own process of oxygen therapy, which has given very good results. He has worked in collaboration with the National Academy of Medicine in Brazil and scientific societies in France. Because of this he was invited to continue his experiments in the latter country, but he refused the offer. The Brazilian government has given him prestige, helping his work. In surgery I want to cite, too, Brandão Filho, well known also for his operations and papers by the physicians who attended in Brazil in the Sixth Congress of this Association. Benedicto Montenegro, from São Paulo, studied medicine in these United States. He has perhaps, after Moynihan, the best statistics of operations on the stomach. He has done about 1,000 operations in this organ. Castro Araujo, young and talented surgeon, is the new professor of the University of Rio de Janeiro. In general medicine I name Annes Dias, a brilliant professor from Rio Grande do Sul State, now teaching in the University of Rio, as well as Rocha Vaz, Clementino Fraga, Aloysio de Castro, Francisco de Castro's son, as brilliant as his father. In psychiatry, Henrique Roxo; in neurology, Antonio Austregesilo; and Waldomiro Pires, one of the pioneers in malariotherapy, are worthy of note. The last has observed more than 800 cases. In dermatology, there are Eduardo Rabello and Joaquim Motta. In tropical diseases and tuberculosis, Cardoso Fontes, the present director of Oswaldo Cruz Institute, is a celebrity. He has very fine studies about tuberculosis, having discovered the filtrability of the Koch bacillus and a valuable method of staining this bacillus, which has proved very useful. In hygiene I would name Barros Barreto, presently administering the Public Health Department. I have many other names to cite in Brazilian medicine, but not to extend this paper I stop, confident that you now have some conception of the state of medicine and medical people.

Our medical relationships with the United States are intensifying. We have had there, for many years, the Rockefeller Foundation, which has done very much for our public health. Now, the Pan American Medical Association has started, since the Sixth Medical Congress held there last summer, a frequent interchange, making known here our scientific advancement. These relationships must be increased. I seize this opportunity to appeal to His Excellency the Ambassador from Brazil and the authorities of the Pan American Medical Association to tie more securely the bonds of American and Brazilian medicine, with the foundation of an American-Brazilian Scientific Institute or a Pan American Institute of Higher Culture, like the French-Brazilian Institute, which we already have. Every year we should have official visits to both of the countries by professors and physicians, showing in each country the progress of the other. The present American Government and our diplomatic representation which have done much to further the interests of the two nations can easily effect this plan. With this added tie our international friendship will ripen. I am sure that in the near future, when financial and political conditions have improved in Brazil, there will be in the western hemisphere two big countries, the United States of North America and the United States of Brazil of South America, joined by the most solid and eternal esteem.

SEASONABLE PRESCRIPTIONS†

Two prescriptions (given below) are combinations of Kaolin for gastrointestinal disturbances, colitis, flatulence, toxemia, and hyperacidity. Two others are combinations, composed of salts without Kaolin for use as antacids, alkalizers, carminatives, mild laxatives, and digestants.

These prescriptions can be filled by the neighborhood pharmacist at reasonable prices and without delay.

The following information regarding Kaolin and its therapeutic application will be of interest in this connection:

Kaolin. Kaolin is aluminum silicate, a form of clay which is insoluble in water. It is not absorbed in the intestines, but passes through the alimentary tract unchanged. In the colloidal state it has a very high power of adsorption. The process of adsorption is of a physical rather than a chemical nature.

Uses of Kaolin. Kaolin has been used successfully in diarrhoea, dysentery, colitis, ulcers, and cholera. In many cases where bismuth had formerly been used, kaolin has been found to be superior. It soothes and protects the irritated intestinal mucosa in colitis and similar conditions. When the ulcerated area is coated with Kaolin it is protected against irritation from the bowel contents thus assisting in the healing process. . . . .

Prevent Self-medication. Do you realize that the indifference of physicians in suggesting to their patients that they purchase certain proprietary remedies by name instead of writing prescriptions is largely responsible for the practice of self-medication by more than 20 per cent of the public? . . . .

℞

	Apoth.	*Metric*
Magmae Kaolini, N.J.F.*	℥ xvi	480.0 cc.

Av. Dose: 4 fluidrachms 3 times a day 1 hour before or after meals.

Note: 4 fluidrachms contain approximately:

	Gr.	*Gm.*
Kaolin......................	48	3.12
Aluminum Hydroxide.........	6	0.39

For gastro-intestinal disturbances, colitis, flatulence, toxemia, hyperacidity.

℞

	Apoth.	*Metric*
Emuls. Kaolini cum Petrolat. Liq., N.J.F.*..................	℥ xvi	480.0 cc.

Av. Dose: 4 fluidrachms 3 times a day 1 hour before or after meals.

Note: 4 fluidrachms contain approximately:

Kaolin......................	gr. 38.4	2.25 Gm.
Aluminum Hydroxide.........	gr. 4.6	0.30 Gm.
Liq. Petrolatum...............	m. 48.0	3.12 cc.

For gastro-intestinal disturbances, colitis, flatulence, toxemia, hyperacidity.

℞

	Apoth.	*Metric*
Pulv. Alkal. Effervesc., N.J.F.*..	℥ iii	90.0 Gm.

Av. Dose: 1 level teaspoonful. Drink while effervescing.

Note: 1 teaspoonful contains approximately:

	Gr.	*Gm.*
Sod. Chloride.................	1	.065
Mag. Sulphate...............	2	.13
Sod. Phosphate..............	2	.13
Calc. Lactate................	2	.13
Citric Acid..................	10	.65
Pot. Bitartrate..............	16	1.04
Sod. Bicarb..................	20	1.30

Keep tightly stoppered.

Antacid, alkalizer.

℞

	Apoth.	*Metric*
Pulv. Bis. Subnitrat. Co., N.J.F.*.	℥ iii	90.0 Gm.

Av. Dose: 1 level teaspoonful in $\frac{1}{2}$ glass of water.

Note: 1 teaspoonful contains approximately:

	Gr.	*Gm.*
Oil Peppermint..............	$\frac{1}{3}$	.02
Phenolphthalein..............	$\frac{1}{5}$	.012
Papain......................	$2\frac{1}{2}$	.162
Diastase of Malt..............	6	.40
Bismuth Subnitrate...........	12	.80
Sod. Bicarb..................	$20\frac{1}{2}$	1.40
Mag. Carb....................	$19\frac{1}{2}$	1.26

Antacid, carminative, mild laxative.

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* New Jersey Formulary.

† Extracted from the Journal, Medical Society of New Jersey, August, 1936. Selected by the Joint Committee on Professional Relations of the Medical Society of New Jersey and the New Jersey Pharmaceutical Association.

MEDICAL ANNALS

of the

DISTRICT OF COLUMBIA

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THE CARE OF THE TUBERCULOUS IN THE DISTRICT OF COLUMBIA

There are now four distinct units for diagnosis and hospitalization of the patient suffering from tuberculosis, namely, the Tuberculosis Hospital within the city, the Tuberculosis Division of Gallinger Municipal Hospital, the Health Department Tuberculosis Clinic equipped for diagnosis and for the clearing of all prospective hospital entries, emergency cases excepted, and the Children's Tuberculosis Sanatorium, Glenn Dale, Md. Within the coming year the fifth unit, the Adult Tuberculosis Sanatorium, will be in operation at Glenn Dale. This latter institution has been reported by competent authority to rank, insofar as equipment and facilities are concerned, among the outstanding institutions of the world. When it is realized that prior to July 1, 1929, the Tuberculosis Hospital, which was then the only facility, was continually filled and that practically all acutely ill indigent patients constituting the overflow therefrom were treated on a per diem basis in private hospitals, with the chronic cases gravitating to the general medical wards at Gallinger Municipal Hospital, and when it is known that there were no diagnostic clinics or special tuberculosis section of the Health Department nor a Glenn Dale for the children, the then generally chaotic situation will be realized. Even with the relatively superior facilities now existing the situation is still far from perfect.

Within the year ending June 30, 1936, 17,555 visits were made to the Health Department Tuberculosis Clinic; 602 of the patients were under 15 years of age and 401 were over 15 years old. The daily average on the tuberculosis pavilions at Gallinger Municipal Hospital was 162 patients in 1936; at the city Tuberculosis Hospital 225. In the Glenn Dale Children's Tuberculosis Sanatorium during the month of September last the daily average of inpatients was 162.4.*

Noteworthy is the study given the tuberculous patient from the time he enters the diagnostic clinic to the time he reaches the hospital wards. He is the subject for many conferences. The coöperation of the surgeon and internist was never better exemplified than in the discussion at conferences. What type of relief is to be applied to the individual? Is collapse therapy indicated? If so, shall it be by artificially induced pneumothorax, phrenicotomy, or thoracoplasty? These are the problems discussed before the conference with the patient and all pertinent data at hand. For more than 12 years collapse therapy has been a part of the progressive plan of treatment at the Tuberculosis Hospital. Pneumothorax refills are made on occasion in the outpatient department. Some 25 phrenicotomies with 24 thoracoplasties have been performed at this hospital under the immediate direction of the chief surgeon. Gallinger Municipal Hospital and the other units are all doing this same type of work.

The work of the Health Department Diagnostic Clinic will be greatly advanced by the institution of the new Health Centers which in all probability, through the united efforts of the Health Officer, the Board of Public Welfare, the Tuberculosis Association, the organized profession, and other groups, will become a reality. One who is at all cognizant of the local facilities cannot help but be impressed with the type of doctor who devotes his time unselfishly to this work. Washington is fortunate in having surgeons and clinicians willing to work largely gratuitously. The selection of house personnel at the various institutions requires much care. Certainly the minimal requirements for a house officer should be a regular internship with special training in chest diagnosis and above all an interest and enthusiasm for the work.

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* See reports from Subcommittee on Tuberculosis of the Committee on Public Health, Dr. W. D. Tewksbury, Chairman, made at meeting of the Society, December 2, 1936.

The incidence of tuberculosis in the District of Columbia will become less through the finding of the early cases. An example of the Health Department activities is the screening processes through use of the tuberculin tests and X-ray studies now given seniors in the local high schools. Of prime importance is the confining of individuals who carelessly expectorate myriads of Koch's bacilli, many of whom have been hospitalized but refuse to remain under surveillance. The Health Officer should have power under the law to segregate such persons.

The work of the Tuberculosis Association must be recognized as a prime force that has brought much to Washington. Our late member, Dr. George Martin Kober, was most active in the earlier days and stimulated much of the present effort. Our own Subcommittee on Tuberculosis of the Committee on Public Health is contributing a good deal. The Christmas seals which you buy have financed, among other things, the Health Officer's work in testing public school students. This Association is jointly active with our own Society in the gaining of the new $250,000.00 health centers.

The renascence of the work in fighting tuberculosis promises much. May continued progress in the gaining of facilities continue to be manifest.

COMPENSATION PRACTICE

Rules of practice under the Workmen's Compensation Act should be known and well understood by every physician who engages or even desires to engage in compensation work. The Compensation, Contract and Industrial Medicine Committee wishes again to call the attention of the members of the Medical Society of the District of Columbia to the fundamental fact that *the law places upon the employer the responsibility of medical care for injured employees.* This responsibility automatically devolves upon the insurance carrier with whom the employer is insured. *The insurance company, therefore, has the unquestionable right to select the physician.* In many instances, if not in the majority, an employee who has been injured and who has chosen his own physician to administer first treatment will be allowed to continue under his family physician's care. In this connection it should be remembered that the free choice of physicians is not a right but a courtesy extended by the insurance company in return for which it can expect certain things. The doctor, in order to continue in attendance, must be able to meet the 8 qualifications outlined in the previous report of your committee, and which report was circularized to the membership. Stated briefly, it is required that immediately after first treatment of a patient the physician should do 3 things: (1) He should ascertain from the office of the Deputy Commissioner the name of the carrier and the adjuster. (2) He should at once contact the adjuster by telephone and state the facts, asking the wishes of the company as to his continuance with the case. (3) He should mail the required blanks, properly made out. Then, if he is continued with the case, reports should be made from time to time on the progress. Attention to these details, with due courtesy, will unquestionably result in more and more cases being left under the care of the family physician.

Your Committee wishes again to stress that the taking over of a case by the insurance company does not in itself constitute cause for complaint to the Compensation, Contract and Industrial Medicine Committee. However, any breach of ethics on the part of the insurance company doctor, such as not getting in touch with the attending physician with a full and frank discussion of the facts, does constitute just cause for complaint to the committee. Lastly, it should be emphasized that it naturally follows, if the insurance doctor is required to observe the rules of ethics in taking over a case at the insistence of the company, that he is equally entitled to courteous treatment from the family physician when contact is made. The exercise of the courtesy of one physician to another, which is the backbone of our code of ethics, is all that is required to smooth the way for all in a path which can be so full of pitfalls.

TRANSACTIONS OF THE WASHINGTON SOCIETY OF PATHOLOGISTS

The meeting of the Washington Society of Pathologists was called to order at 1:35 P.M., November 7, 1936, in the Army Medical Museum, by the President, Dr. Roger M. Choisser. There were 15 members and guests present. The minutes of the meeting of October 3 were read by the Secretary, Captain Elbert DeCoursey, and approved.

A new Constitution and By-laws were adopted. The new Council was voted to be composed of Dr. Choisser, President; Dr. Lester Neuman, Vice President; Captain DeCoursey, Secretary-Treasurer; Dr. Oscar B. Hunter, Councillor (2 years); Dr. J. W. Lindsay, Councillor (1 year).

Scientific Paper

"ENDOTHELIOMA OF THE PLEURA." **Robert J. Jermstad, M.D.**, George Washington University.

The patient, a colored male, aged 60 years, was admitted complaining of shortness of breath and pain in his chest for the preceding 9 months. He had lost 15 to 20 pounds in the last 2 months and had no other notable complaints. The autopsy revealed a liver which was enlarged (weight 3,180 gm.) by innumerable tumor nodules varying in size up to 5 cm. in diameter. Many of them were discrete, others confluent. Several near the surface were umbilicated. These masses were firm and whitish. There was no evidence of the tumor extending or connecting directly with the diaphragm. The left pleural cavity contained about 2,000 cc. of hemorrhagic fluid. The mediastinal pleura, the whole of the costal pleura, and the diaphragm were thickened by a dense whitish diffuse infiltration which grossly appeared to be made up of much connective tissue. This infiltration also extended into the intercostal spaces. The lung itself was collapsed and covered by a thickened pleura. The right pleural cavity was not involved.

Microscopic examination revealed the type cell to be an elongated spherical cell. Mitotic figures were few in number. In the pleura there was marked connective-tissue proliferation with strands and isolated groups of cells occurring among the connective tissue. There was a tendency toward alveolar formation which was particularly marked in the liver. Sections of both lungs showed numerous areas in which the alveoli and vessels were packed with these cells. The mediastinal lymph nodes were also involved.

In the discussion uncertainty as to endothelial origin was general. A study to ascertain a possible presence of mucin was suggested. The majority present believed this tumor to be a carcinoma, probably bronchiogenic.

Presentation of Cases

Dr. Harry A. Davis presented the case of a colored female, aged 42 years, who noted slightly tender nodules on the chest wall 3½ months before death. Two months before death flaccid paralysis of both lower extremities developed. The Kahn test was negative. At autopsy, neoplastic masses were found involving the sternum, right clavicle, ribs, and compressing the spinal cord. Microscopic sections revealed sheets of cells resembling plasma cells with little intercellular stroma.

In the discussion it was brought out that there were no abnormal blood changes, that the X-ray examination revealed "punched-out" areas in the clavicle and that the head could not be examined at autopsy. It was noted that Hodgkin's disease of bone might be the underlying change, although multiple myeloma was the most probable diagnosis.

Dr. H. V. Connerty presented the case of a 63-year old colored male with autopsy on June 1, 1933. The clinical diagnosis was carcinoma of the stomach, hypostatic pneumonia and generalized arteriosclerosis. The anatomic diagnosis was endothelioma of the pleura, left; left pleural effusion; thrombophlebitis of the right jugular vein; atheroma of the aorta; luetic aortitis; old healed miliary tuberculosis of the lung, liver, spleen and kidney; adhesive pleuritis, right; fibrinous pleurisy, right; and healed aortic valvulitis. The tumor invaded the left lung and metastasized to the mediastinal lymph nodes and the lymph nodes of the neck, possibly also to the left axilla, to the peritoneum covering the fundus of the stomach anteriorly into the right sixth rib. On admission the temperature was subnormal. The patient vomited everything. There was upper abdominal discomfort and constipation. The left pleural cavity contained approximately 1,000 cc. of clear, straw-colored fluid. The left lung was collapsed. The heart was small. The right lung was large and voluminous. The hepatic lesions were interpreted as healed tuberculosis. The spleen was small. There was a tumor nodule on the anterior surface of the fundus of the stomach measuring 2 cm. in diameter. The sixth rib near the costal-cartilaginous junction presented a tumor nodule 2 cm. in diameter which had invaded the bone.

In the discussion the similarity to the case presented by Dr. Jermstad and the difficulty of determining whether this tumor was of glandular or endothelial origin were considered.

Captain Hugh R. Gilmore, Jr., presented the case of a male, aged 24 years, who had had a mole on the left leg for 1 year, of slow growth, from the size of a pea to the present size of a marble. Microscopically, there were no nevus cells but some pigment beneath the epithelium. Special stains indicated that this pigment was melanin and iron. Whether this might possibly be a so-called blue nevus or an aberrant mongolian spot was the information requested.

In the discussion "locus pigemtosum" was suggested, since the only definite finding was pigment.

Dr. L. L. Ashburn presented the case of a white male, aged 52 years, who was admitted to the hospital, September 22, 1936, with a painful expansile tumor in the region of the tuberosity of the right tibia. The tumor was approximately 2 by 3 cm. and oval in shape. The tibia was eroded anteriorly and posteriorly, leaving a thin cortex laterally and medially. In January, 1936, he had a fracture of the lower third of both bones of the right leg. Satisfactory reduction was obtained. X-ray studies suggested medullary sarcoma and no metastases.

The discussion concerned mostly the question of the fat content of the tumor cells. It was said that this is the eighth case of liposarcoma of bone that is known.

Dr. R. D. Lillie presented the case of a white male veteran, a window dresser, aged 47 years, who following a prolonged alcoholic debauch acutely developed jaundice. Two weeks later, jaundice continuing, he came to the hospital in a critical condition but without fever. The urine showed a little albumen, 3 plus pus and 1 plus blood. Acute hepatitis, carcinoma of the head of the pancreas, and possibly empyema of the gallbladder were considered. He was operated on and died 5 hours after operation. The necropsy revealed the kidneys to be enlarged, weighing 350 to 400 gm., the centers of the lobules of the liver showing fatty fine droplets, and a certain amount of retention of bile pigment in the bile capillaries. The nature of the process in the liver was obscure.

In the discussion periportal fibrosis as the primary change and the possibility of jaundice from pneumonia were considered.

The meeting adjourned at 4:15 P.M.

COMING MEETINGS

Wednesday, January 6: Stated Meeting of the Society. Election of members, reports of committees, etc.

Wednesday, January 13: Symposium on Fractures. Regional Committee of the American College of Surgeons, under the direction of Guy W. Leadbetter, M.D.

Friday, January 15: *Section on Ophthalmology and Otolaryngology.*

1. "Bleeding from the Nose. Its Anatomical Aspects and Treatment." Earle G. Breeding, M.D.
2. "Thoracic Surgery in its Relation to Otolaryngology." Edgar W. Davis, M.D.

Wednesday, January 20: No meeting, Inauguration Holiday.

Friday, January 22: *Section on Internal Medicine.*

1. "The Significance of Vascular Changes in the Retina." Benjamin Rones, M.D.
2. "The Etiology of Pellagra." Austin A. Chinn, M.D.

Wednesday, January 27:

1. "Clinical Survey of Contraception in General Practice." Thomas E. Mattingly, M.D. Discussion: Howard F. Kane, M.D.
2. "Present Knowledge on the Rhythm of Human Fertility: Some Biological and Physiological Considerations Affecting its Practical Application to Problems of Sterility and Birth Control." Prentiss Willson, M.D.

Washington Ophthalmological Society will meet Monday, January 4, 1937, at 7:30 P.M., at the Episcopal Eye, Ear and Throat Hospital. The program: "Ocular Tuberculosis": (a) Presentation of Cases.
(b) Symposium.

Guest Speakers: Dr. Jonas Friedenwald, Baltimore.
Major James E. Ash, Army Medical Museum.
Drs. Leland Parr and John Hanks.

ANNUAL SCIENTIFIC ASSEMBLY
MAY 5-6, 1937

Under the general chairmanship of Dr. Joseph Horgan plans are under way for the Ninth Annual Assembly, which in essence is a postgraduate course sponsored by the Medical Society of the District of Columbia. There will be as usual no registration fees. The profession in the states is extended a cordial invitation to attend. The subchairmen selected are:

Daniel F. Lynch, *Associates*
Charles H. McEnerney, *Attendance*
John D. Wynkoop, *Banquet*
Stuart O. Foster, *Medical Clinics*
W. Warren Sager, *Surgical Clinics*
W. Preston Haynes, *Entertainment*
Earl R. Templeton, *Finance*
B. F. Dean, Jr., *Halls and Exhibits*
P. S. Constantinople, *Luncheon*
Raymond W. Murray, *Printing*
B. W. Leonard, *Program*
George K. Nutting, *Public Meeting*
W. W. Chase, *Publicity*
Coursen B. Conklin, *Registration*
Alec A. Preece, *Woman's Auxiliary Liaison*
Ella M. A. Enlows, *Women Physicians*

Members wishing to present a paper or a scientific exhibit are urged to make contact at the earliest time with the appropriate subcommittee.

NEWS AND PERSONALS

The **Smith-Reed-Russell Society** of the George Washington University School of Medicine was addressed on December 15, 1936, by Dr. Thomas Parran, Surgeon General, United States Public Health Service, on the subject, "The Enlarging Opportunities for a Career in Public Health."

Dr. Earl B. McKinley, Dean of the George Washington University School of Medicine, has been granted Sabbatical leave. In January he will go to the Orient where he will conduct research on leprosy under the auspices of the American Leprosy Foundation (formerly the Leonard Wood Memorial). Later, on traveling around the world, additional material will be gathered concerning the geographical distribution of disease for inclusion in a volume entitled "A Cartography of Disease," now in preparation under a grant from the Carnegie Institution of Washington, D. C. This will follow a book recently published on the geography of disease. Dr. McKinley will return to his post at the School of Medicine in September, 1937.

Dr. Harry S. Bernton, Professor of Hygiene, Georgetown University School of Medicine, has been appointed Clinical Specialist in Allergy in the Bureau of Chemistry and Soils of the United States Department of Agriculture. Dr. Bernton will take part in a research project concerning the chemical nature of allergens which has been planned by the Department.

First International Conference on Fever Therapy will be held at the College of Physicians and Surgeons, Columbia University, New York City, March 29–31, 1937.

March 29 will be devoted to the discussion of physiology, pathology, and methods of production of fever; Dr. Frank W. Hartman, Henry Ford Hospital, Detroit, chairman of the committee arranging this section of the program, and Dr. Charles A. Doan, Ohio State University, secretary.

March 30 is to be spent in the consideration of miscellaneous diseases treated by fever, such as chorea, rheumatic carditis, ocular diseases, arthritis, leprosy, meningococcus infections, undulant fever, tuberculosis, tumors, skin diseases, etc. This session will be arranged by Dr. Clarence A. Neymann, 104 South Michigan Boulevard, Chicago, chairman, and Dr. Frank H. Krusen, Mayo Clinic, secretary.

March 31, morning, is to be devoted to the consideration of syphilis; Dr. Walter M. Simpson, Miami Valley Hospital, Dayton, Ohio, chairman of this section, and Dr. Leland E. Hinsie, New York State Psychiatric Institute, New York City, secretary. In the afternoon of the same day the treatment of gonorrhea by fever is to be discussed; Dr. Stafford L. Warren, Strong Memorial Hospital, University of Rochester, Rochester, New York, chairman, and Dr. Charles M. Carpenter, Rochester, New York, secretary.

Those desiring to participate are requested to communicate with the chairman of the section in which they are interested. The manuscripts of all papers must be submitted to the appropriate chairman before February 1, 1937. Selection for the program will be made by February 15.

Brigadier General Henry C. Fisher, M.C., U. S. A.

1867–1936

General Fisher, who has been an Associate Member of this Society during two periods of his assignment to this District, 1914–1918 and 1930–1936, was graduated from Georgetown University receiving master of arts and doctor of medicine degrees. He entered the Medical Corps of the United States Army in 1891 and served throughout the Spanish American and World Wars with distinction, receiving the Silver Star Citation in the former war; in the latter the Distinguished Service Medal and a citation for "exceptionally meritorious and conspicuous services in the Surgeon General's Office, Supply Division."

General Fisher's last assignment was Assistant to the Surgeon General. On May 31, 1931, he was retired after nearly 40 years of serve.

He is survived by no immediate relatives. His wife, Mrs. Jessie Fisher, died in 1934.

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